RUBBER WORLD

OUR 65th YEAR

A BILL BROTHERS PUBLICATION

JUNE, 1954

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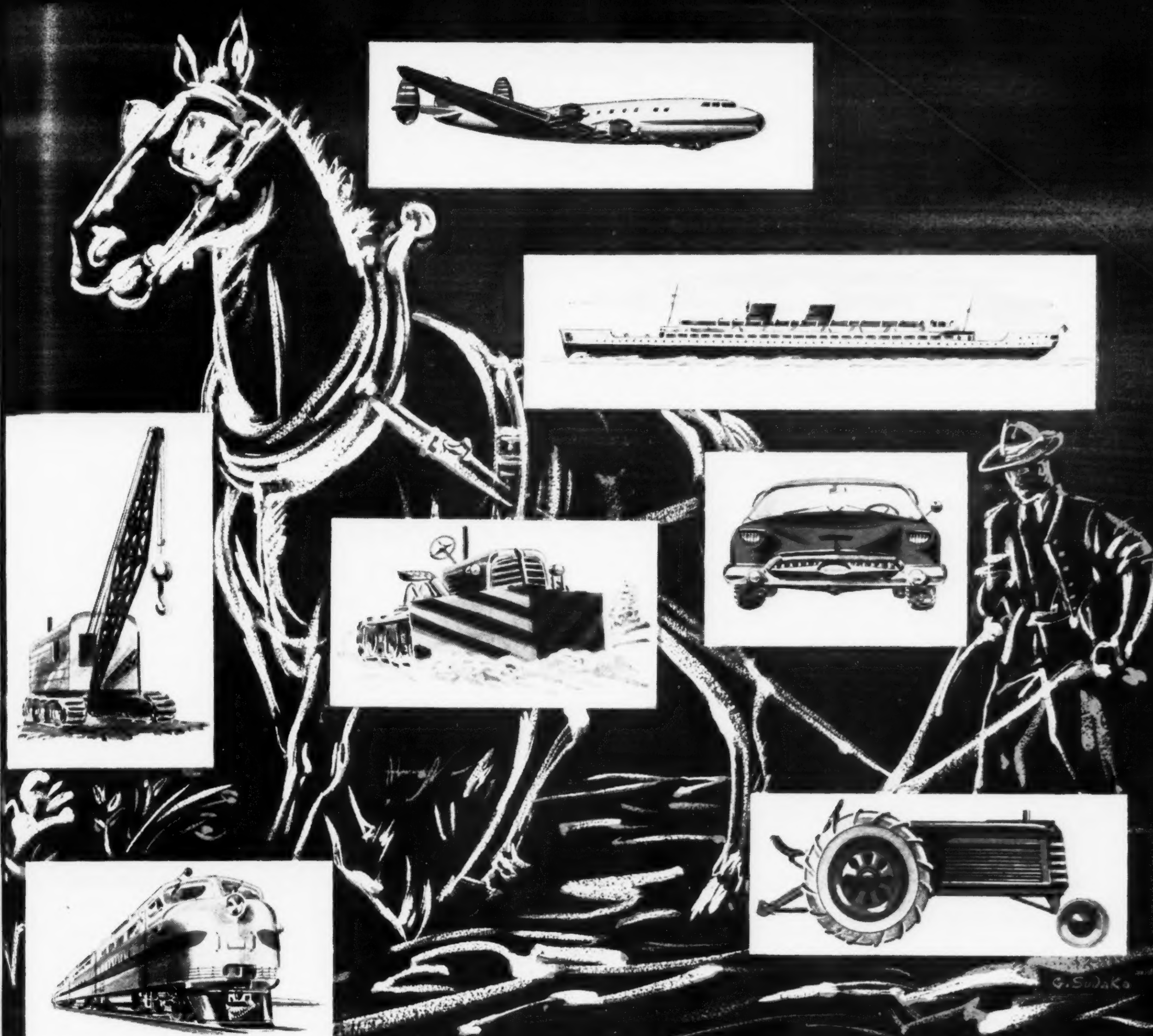

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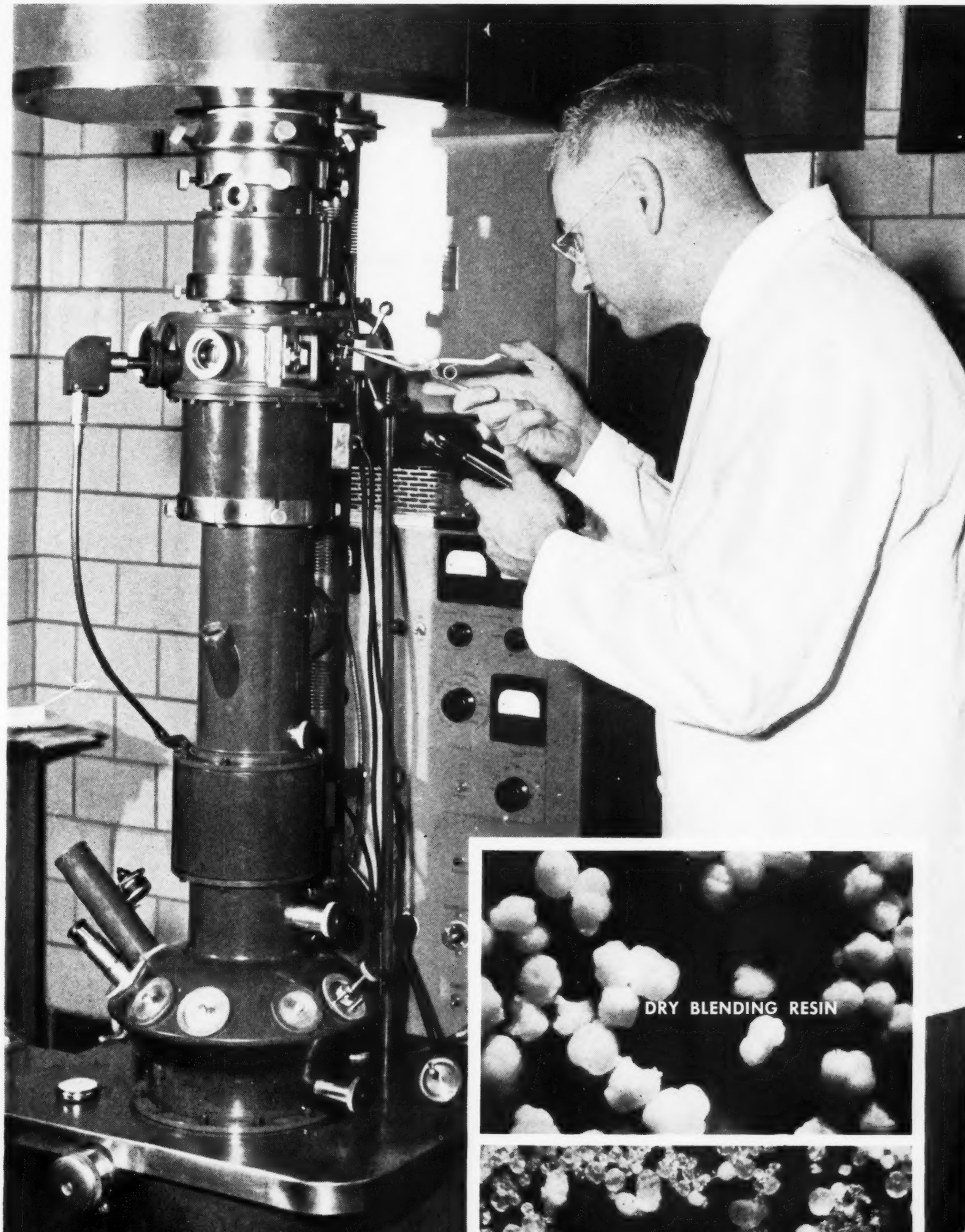
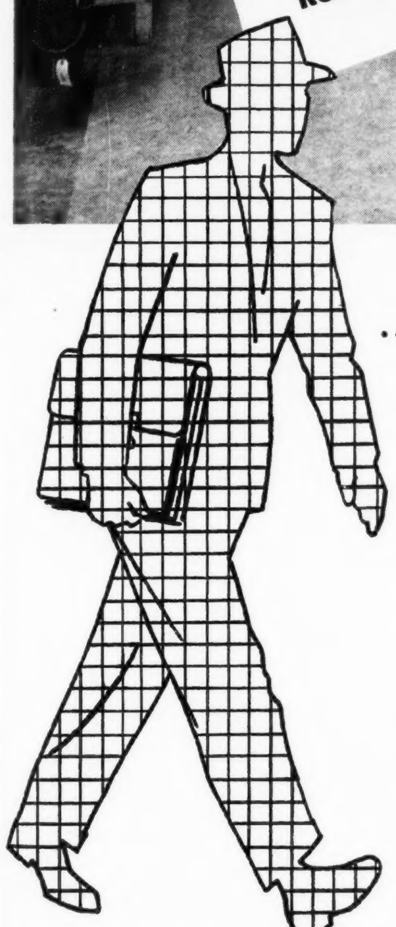


THE DIFFERENCE IN PARTICLES that gives you better dry blending PLIOVIC resins is obtained with the help of this electron microscope which magnifies from 5 to 50,000 times. In these photomicrographs, note the uniformity in size, shape and structure of the particles of the dry blending resin as compared to those of the conventional resin.



...backed up by a fine LABORATORY STAFF

When is a salesman NOT a salesman? That's when you throw a tough, technical question at him and he comes up with the right answer! Our salesmen have been coming up with the right answers for years because they are all TRAINED RUBBER TECHNOLOGISTS. They are fully capable of intelligently discussing your compounding or processing problems. This "know-how" type of sincere selling has been building firm, friendly and financially sound business for our customers and ourselves for over 70 years.

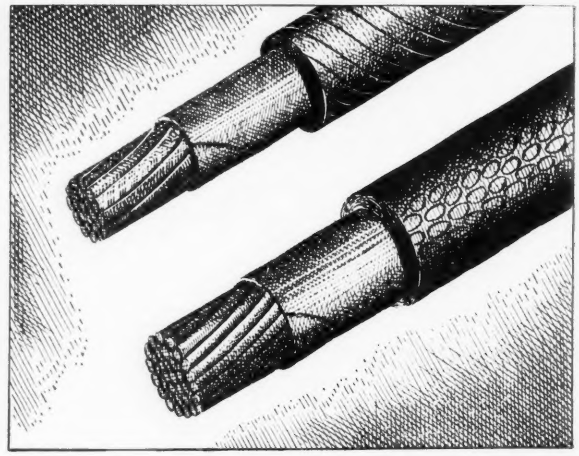
Naturally, we don't mean that our salesmen are all top-drawer rubber research chemists, but when the questions get that tough, they have the rare good sense to tell you: "I don't know, but I'll find out". For them to get a fast answer to a "toughie" at our plant doesn't take long either, because we back up our sales staff with an experienced, fast-moving laboratory group. Our past achievements and national recognition attest to this.

Next time you have a compounding or processing problem and need assistance, call in your U. S. Rubber Reclaiming Co. salesman. He knows how to help you.

Our 71st year serving the industry solely as reclaimers

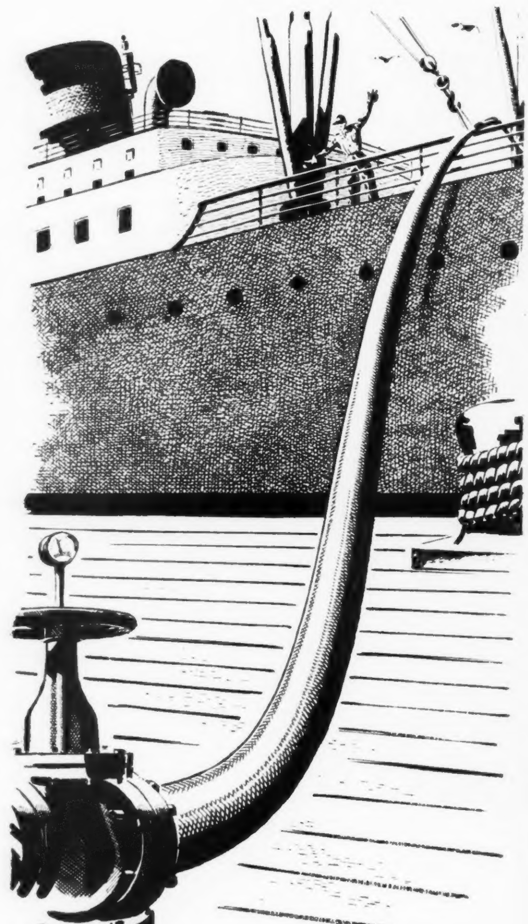
U.S. RUBBER RECLAIMING COMPANY, INC.
P. O. BOX 365 BUFFALO 5, N. Y.

For industrial conveyor and power transmission belts, Wellington Sears has a complete line of fabrics to insure long life and top performance.



"Columbus" sheeting is ideally suited for cable wrapping and other rubberized mechanical goods because of its constantly uniform quality.

YOU GET VERSATILE FLEXIBILITY WITH WELLINGTON SEARS *HOSE DUCK*



Service-proven in a wide variety of industrial hose applications, Shawmut Hose Duck is woven to lead a long and flexible life.

This Wellington Sears duck is a soft, strong, plied-yarn cotton fabric assuring flexibility and good impregnation. You'll find it available in many standard, as well as special, constructions for specific requirements.

With over 100 years' experience in industrial fabrics, Wellington Sears offers a complete line of cotton ducks for hoses of all types, belting and other mechanical rubber products . . . also fabrics utilizing the unique properties of high tenacity rayon, nylon and other fibers for rubberized specialties of many kinds.

If it's a rubber-and-fabric problem — talk it over with Wellington Sears.

Write for your free copy of "Modern Textiles for Industry" which includes pertinent information on rubber applications. Address: Wellington Sears Co., Dept. K-4, 65 Worth St., N. Y. 13.

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Belting duck	Airplane cloth
Hose duck	Balloon cloth
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Single and plied-yarn chafers	synthetics and
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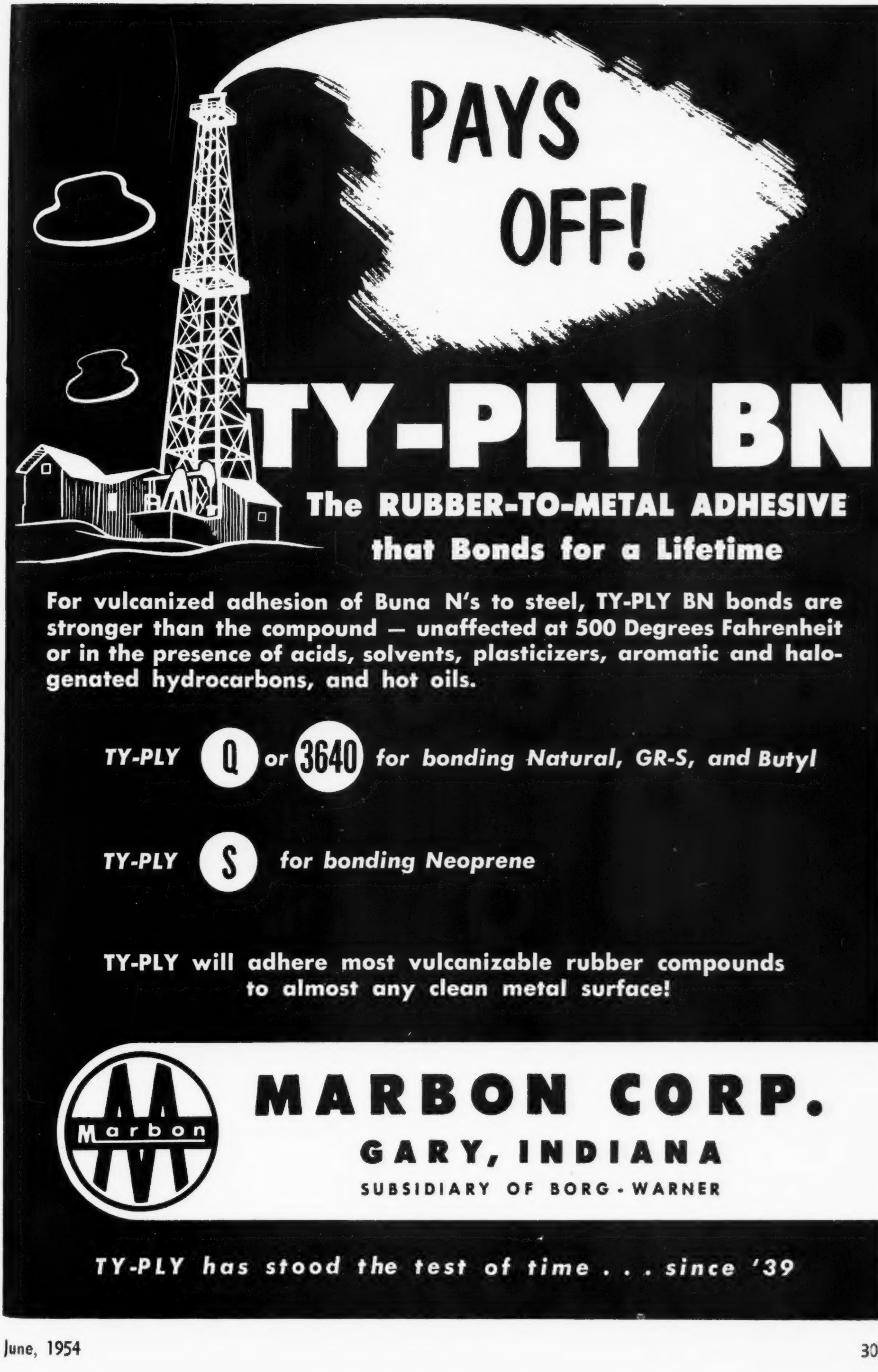
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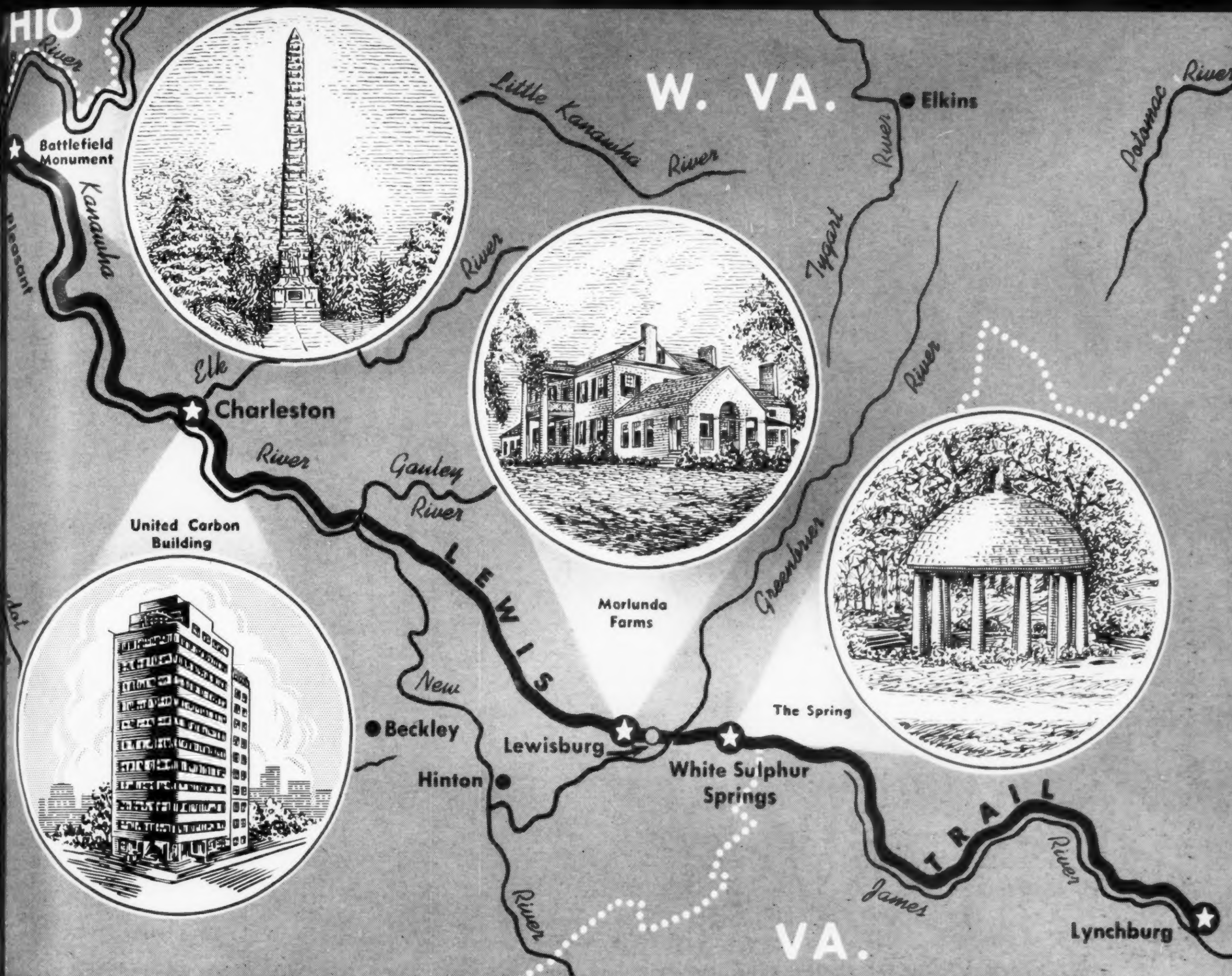

The Lewis Trail

Though not as well known as the more famous trails, the Lewis Trail, which journeyed from Lynchburg to Point Pleasant, at the juncture of the Ohio and Kanawha rivers, passed through an area which was to become important to industries based on natural gas and oil. The trail became an important link connecting Virginia and the Ohio valley, brought people into what is now southern West Virginia and into the northwest territory.

Along this trail in those early days was a natural phenomenon, once owned by George Washington — Burning Springs. At this place, not far from present Charleston, escaping natural gas burned and was to the Indians a sight of awe and wonder. It was in this same area that the earliest settlers drilled for salt brines, often striking natural gas. In years of drilling, techniques were developed which later were used in the oil and gas fields.

Also along this trail the traveler passed by White Sulphur Springs and the beautiful farming area which now includes Morlunda Farms; the site of present Charleston and its tremendous chemical industry, and at the end of the trail, Point Pleasant, where the great Indian chief, Cornstalk, was defeated in 1774.

Carbon blacks came from this generalized area many years ago. The United Carbon Company, whose first plants were located not far distant, came into being in the area over which the settlers once trod.

From Charleston are directed the activities of United Carbon Company in the production of the best in carbon blacks.

UNITED CARBON COMPANY, INC.

How to Lower Vinyl Compounding Costs

Chlorowax* 40 and Surfex* MM can be used separately or in combination to lower vinyl compounding costs and increase batch yields with no sacrifice in quality. Chlorowax 40 is DIAMOND ALKALI's liquid chlorinated paraffin which has gained wide acceptance as a low-cost co-plasticizer. Surfex MM is one of DIAMOND's precipitated calcium carbonates—a filler of high uniformity and purity.

The table below shows how these DIAMOND Chemical products can be used to produce two-way savings. Your nearby DIAMOND Sales Office can show you other moneysaving formulas and supply detailed cost comparisons, or write DIAMOND ALKALI Co., 300 Union Commerce Building, Cleveland 14, Ohio. *®

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TRY THIS RECIPE FOR LOWER COST VINYL COMPOUNDS

DIAMOND ALKALI CHEMICALS ®

DIAMOND ALKALI COMPANY
CLEVELAND 14, OHIO

	Parts
PVC Resin	100
Primary Plasticizer	50
Chlorowax 40	10
Stabilizer	3
Stabilizer-Lubricant	0.5
Surfex MM	20
	183.5
Hardness	85A
Tensile Strength	2600 psi
Elongation	375%
100% Modulus	1400 psi
Crescent Tear	375 lbs./in.
Brittleness-Temperature	−29°C
Heat Loss	4.7%

ACTIVATOR NEWS

HORSE HEAD PRODUCTS

A supplement to THE ACTIVATOR—the house organ issued by The New Jersey Zinc Company for over 15 years to aid the Rubber Industry in its use of Zinc Oxide.

UNIQUE COATING

on ZINC OXIDE outwits humidity

Customers tell us that, even in high humidity, switching to PROTOX*-166 ZINC OXIDE provides uniformly fast mixing and excellent dispersion.

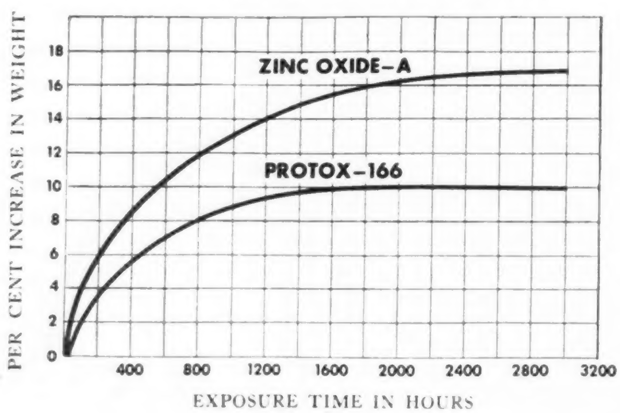
The outstanding humidity resistance of PROTOX-166 stems from the patented coating of zinc propionate that seals the individual particles. Here is how it works:

1. It reduces moisture pickup (see chart).
2. It prevents aggregation that leads to poor dispersion.
3. It is readily wetted by rubber.

*U. S. Patents 2,303,329 and 2,303,330

MOISTURE ABSORPTION OF ZINC OXIDES

under saturated conditions at 77° F.



Protox-166, surface-coated with zinc propionate, picks up less moisture in storage than do untreated types, such as Zinc Oxide-A, and thus processes more uniformly and faster.

TEST PROCEDURE

Three grams of pigment were weighed into wide-mouth (2" dia.) weighing bottles and conditioned for 24 hours over calcium chloride at room temperature. After determining the net weights of the samples, the bottles were stored, unstoppered, over water in a large container held in a constant temperature (77°F.) room. The thin layer of each sample was stirred once daily to assure a uniform condition throughout the oxide, and was weighed periodically to determine the per cent increase in weight.

NOTE: The per cent moisture pickup for zinc oxides in this test is, of course, far more than would occur under industrial storage conditions in multi-walled bags.

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... most used by rubber manufacturers since 1852

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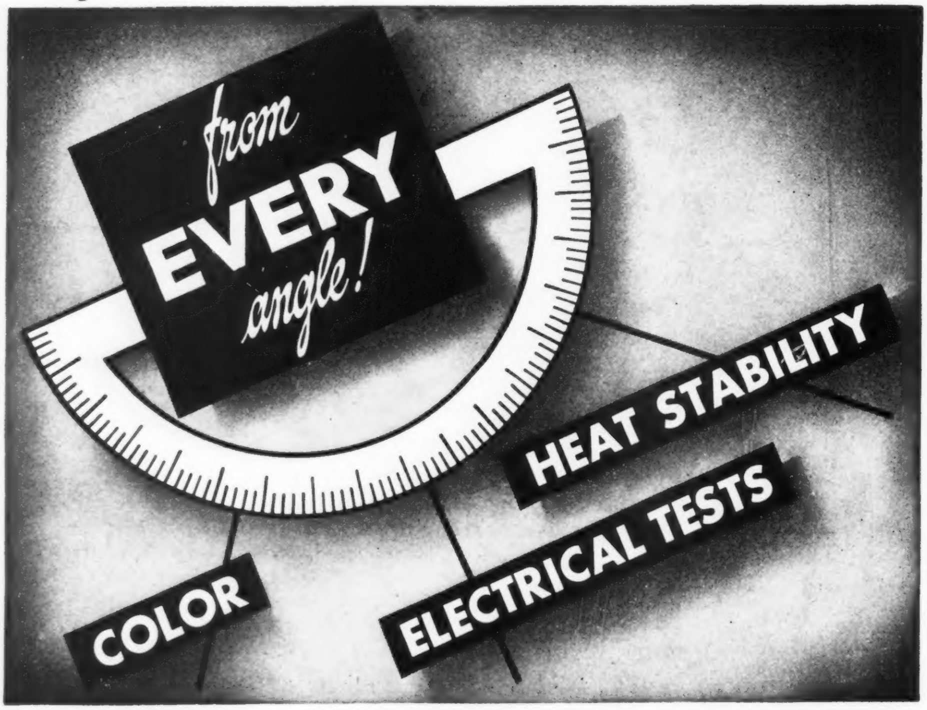
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Our Technical Service Department will be glad to help you achieve the most desirable white pigmentation in your compounds through the best use of TITANOX. Titanium Pigment Corporation, 111 Broadway, New York 6, N.Y.; Atlanta 2; Boston 6; Chicago 3; Cleveland 15; Los Angeles 22; Philadelphia 3; Pittsburgh 12; Portland 9, Ore.; San Francisco 7. In Canada: Canadian Titanium Pigments Limited, Montreal 2; Toronto 1.

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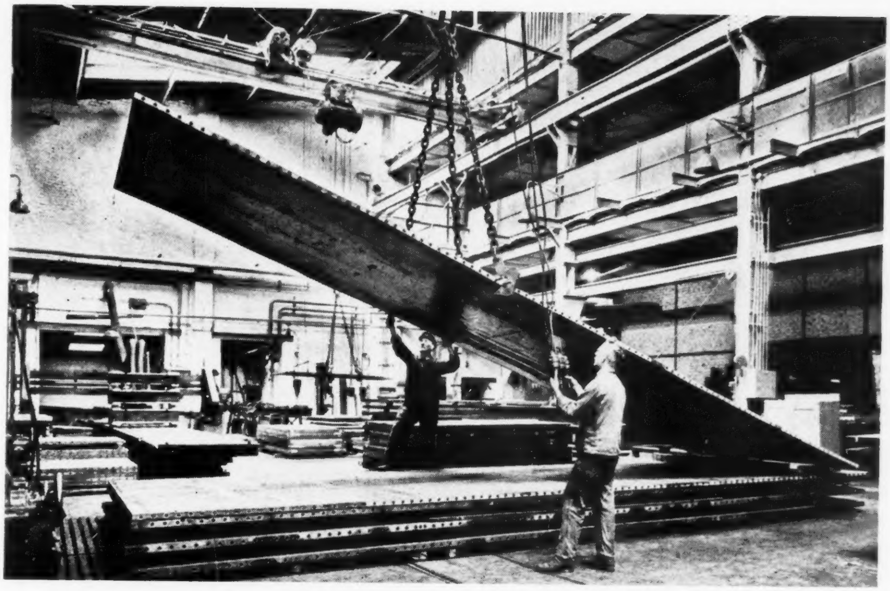
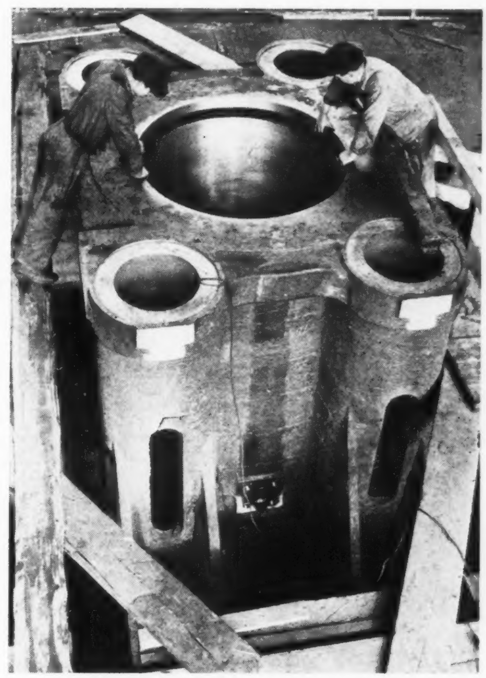
TITANOX



Platens for belt press being moved to be ground and polished.

Ram Pot for one of the larger hydraulic presses.



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The versatility of vinyl dispersion (Plastisol) compounds lends itself to many wide and varied applications. The Watson-Standard laboratories can help you adapt these products to production and end uses.

Molding:

Watson-Standard Vinyl Plastisols and Rigidsols have been used with both slush molding and dip molding. Such items as doll and doll parts, toys, spark plug covers, electrical components, novelties, puppets, toilet valves, boats, light sockets and others are illustrations of this type of application.

Dipping:

Watson-Standard Vinyl Organosols and Plastisols have been applied by dipping. Varied end products include dishwasher baskets, dish racks and drainers, electrical wiring, gloves, and springs for the automotive and upholstery industries.

Spreading:

Watson-Standard Vinyl Plastisols and Organosols may be spread coated. Coated textiles and paper are typical of this type of application.

Spraying:

Special foundations of Watson-Standard Vinyl Organosols and Plastisols may be applied by spraying. Finishes for metal furniture, cabinets and blowers are representative uses.

Casting:

Since Watson-Standard Vinyl Plastisols are in liquid form and may be readily poured, they lend themselves to casting. Casting applications include films, sealants for automotive and refrigeration industries, ceramic pipe joint threads, and potting compounds.

Troweling:

Watson-Standard Vinyl Plastisols may be formulated for troweling. This type of application lends itself to linings for tanks and sealants.

The Watson-Standard laboratories have formulated compounds for many end uses and methods of application. We will assist you with your problems.

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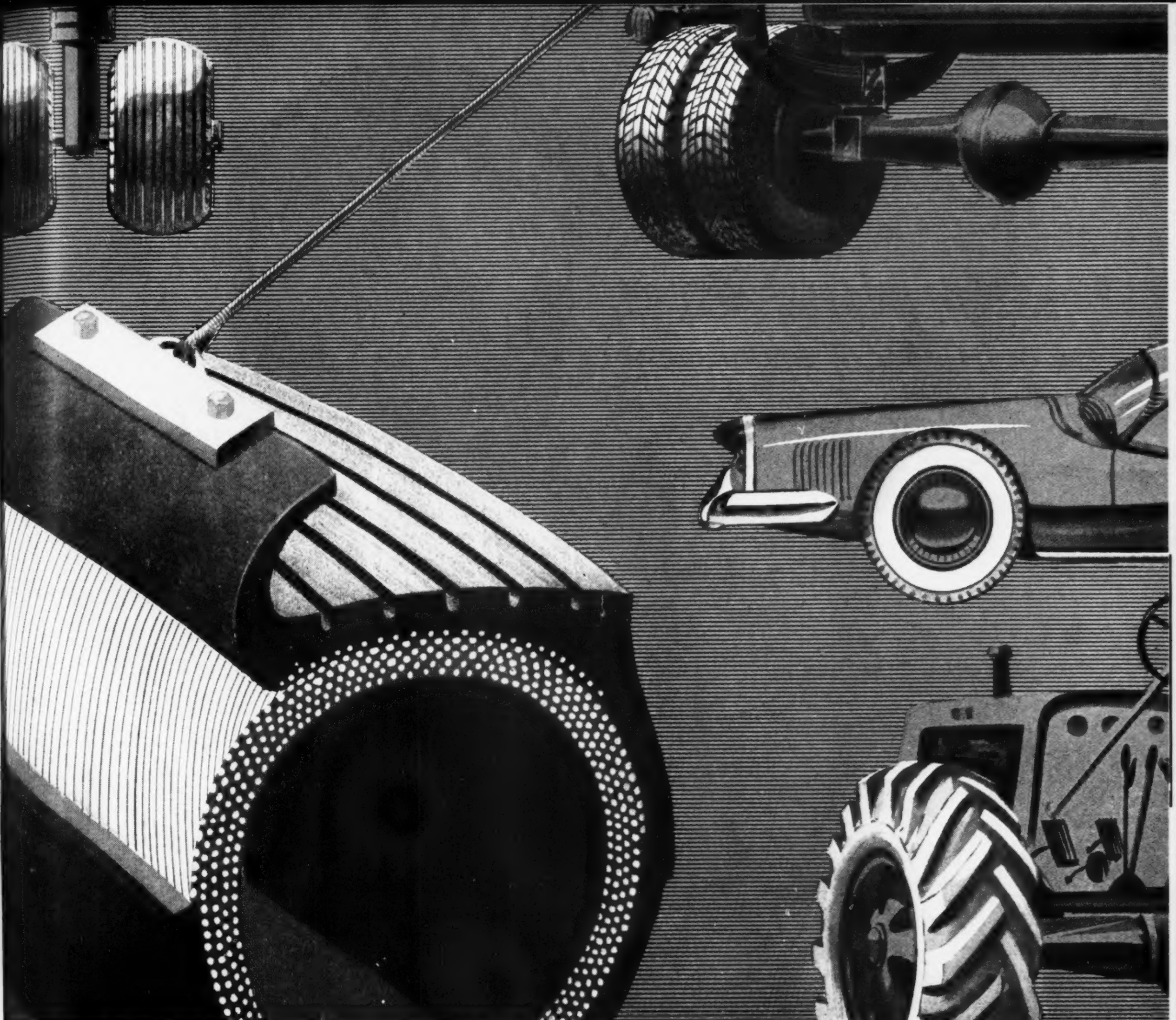
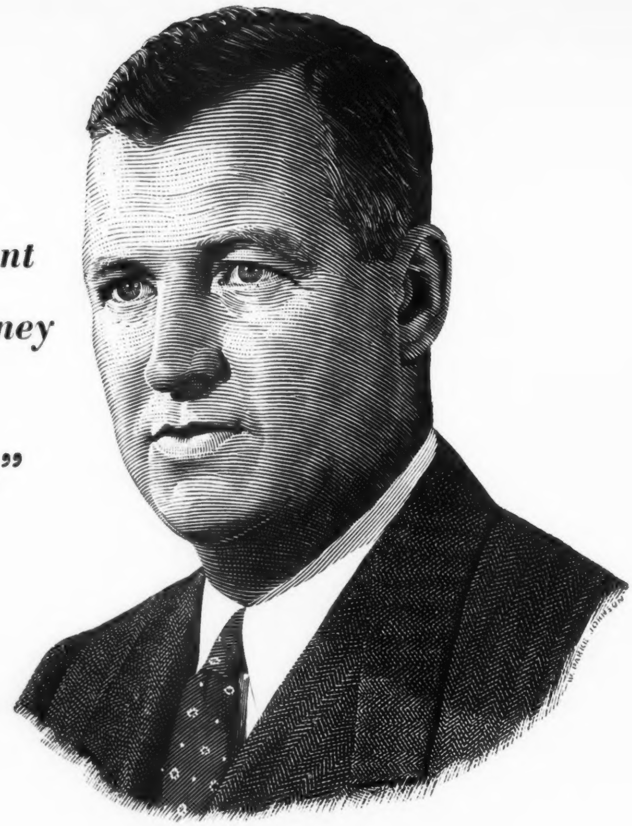


"Wise public debt management with its goal of sound money is of prime concern to every American."



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President
Republic Aviation Corporation

"Wise public debt management with its goal of sound money is of prime concern to every American. Regular purchase of U. S. Savings Bonds contributes importantly to the achievement of this objective and, at the same time, helps assure our future security, individually and as a nation. We at Republic Aviation feel a deep sense of pride in the knowledge that 94% of all our employees became investors as a result of our most recent campaign and that $631,000 in bonds are purchased each month on our automatic Payroll Savings Plan."

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• At the end of 1953, the cash value of Series E and H Bonds *held* by individuals was more than 36 billion dollars. This total is growing steadily, thanks largely to the month after month purchases of Series E Bonds by more than 8,000,000 Payroll Savers.

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• The ownership of more than $36,000,000,000 in Savings Bonds by millions of Americans constitutes a reservoir of future purchasing power—an asset to industry and business as well as to the individuals who built it by their Bond-conscious thrift.

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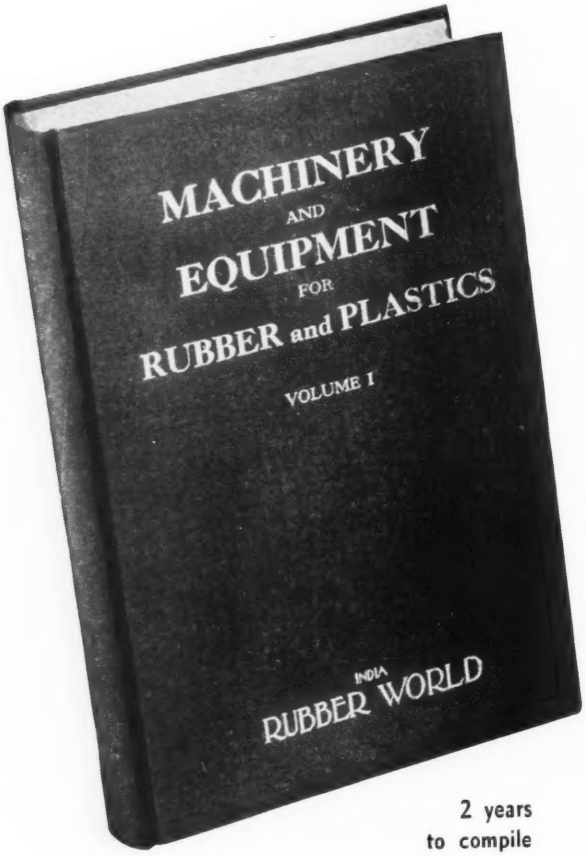

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The urgent need and value of this 804 page book will be self-evident to all engineering, processing, purchasing and management personnel, especially to those men who have been confronted in the past with the problem of gathering this frequently needed and vital information from varied and widely-scattered sources.

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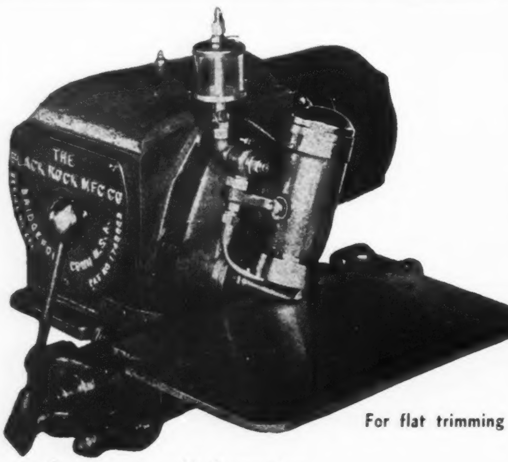

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PX-108 DiIsoOctyl Phthalate	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓
*PX-114 Decyl Butyl Phthalate	✓✓	✓✓	✓	✓	✓✓✓	✓
PX-138 DiOctyl Phthalate	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓
PX-208 DiIsoOctyl Adipate	✓✓✓				✓	✓✓
*PX-209 DiNonyl Adipate	✓✓✓		✓✓	✓	✓	✓✓✓
PX-238 DiOctyl Adipate	✓✓✓		✓		✓	✓✓
PX-404 DiButyl Sebacate	✓✓✓				✓✓✓	
PX-438 DiOctyl Sebacate	✓✓✓		✓✓✓	✓✓✓	✓	✓✓✓
*PX-800 Epoxy	✓	✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓
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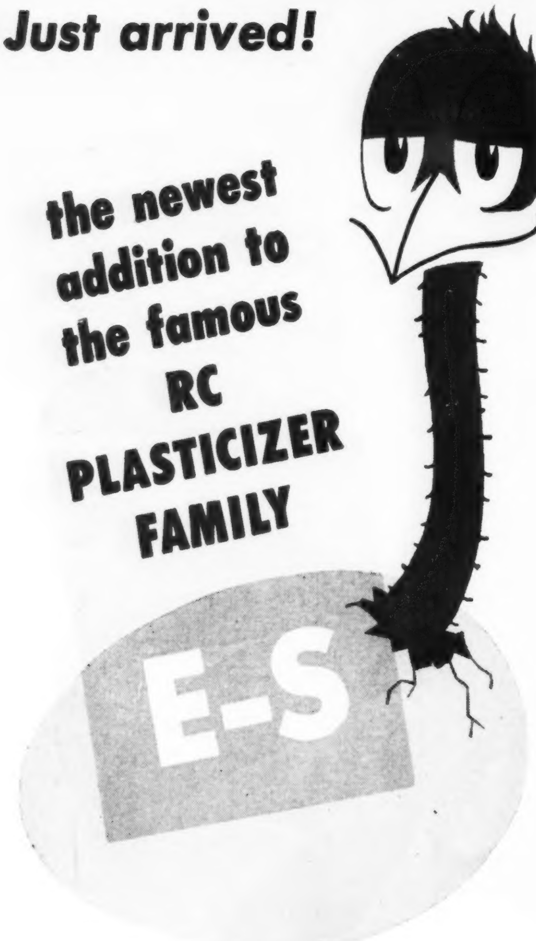

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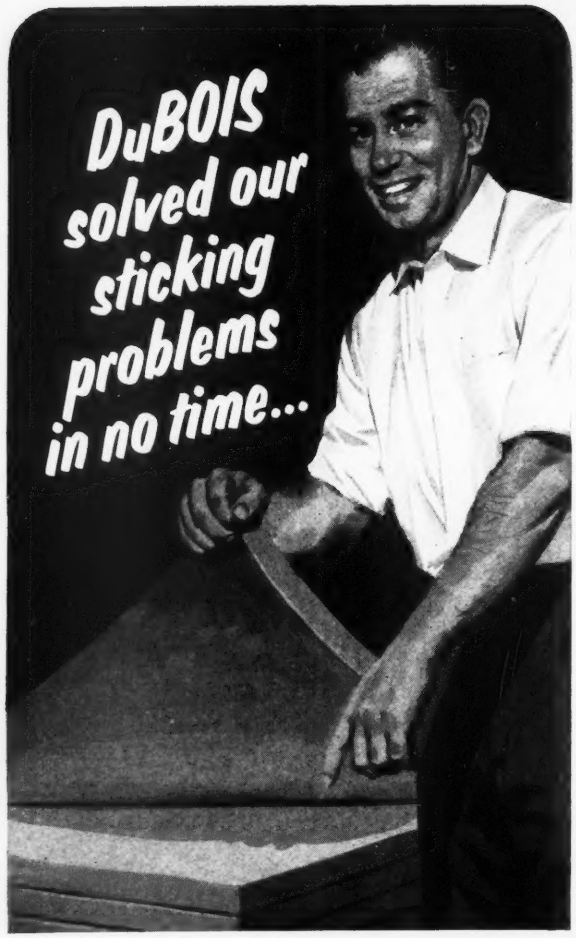
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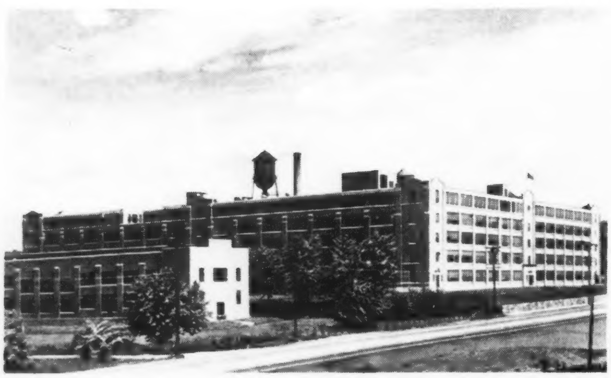

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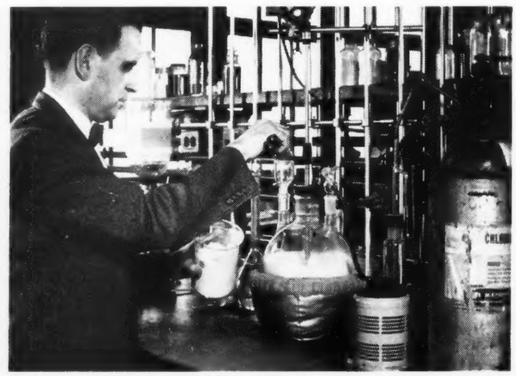

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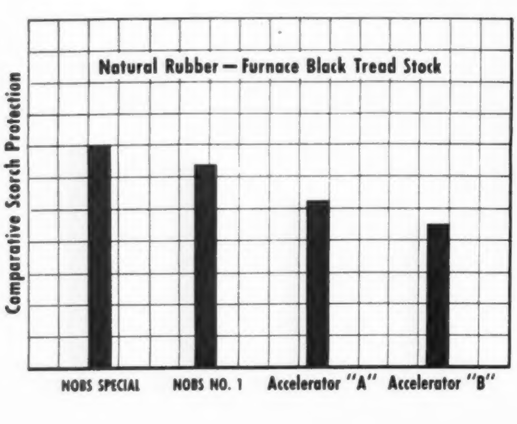

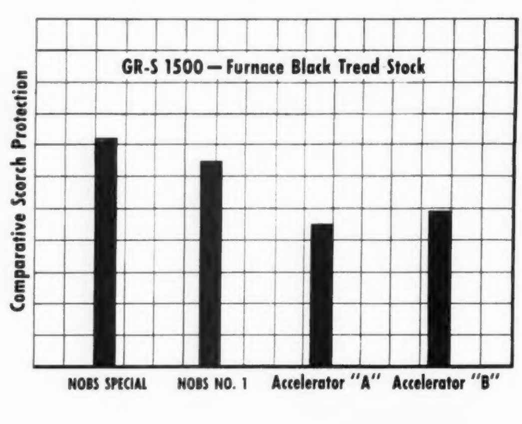

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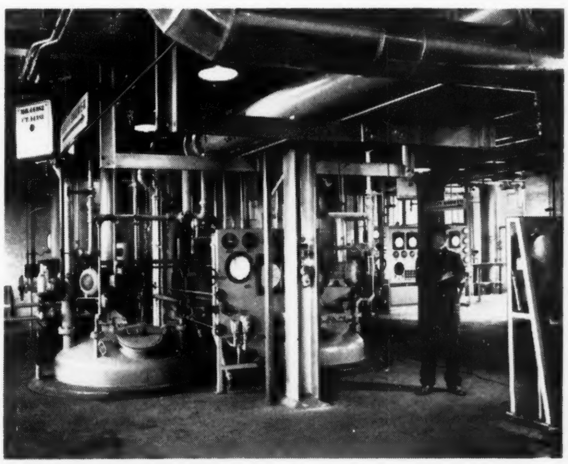

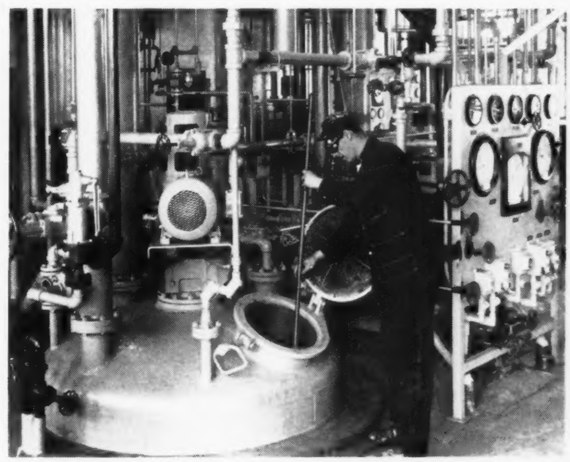

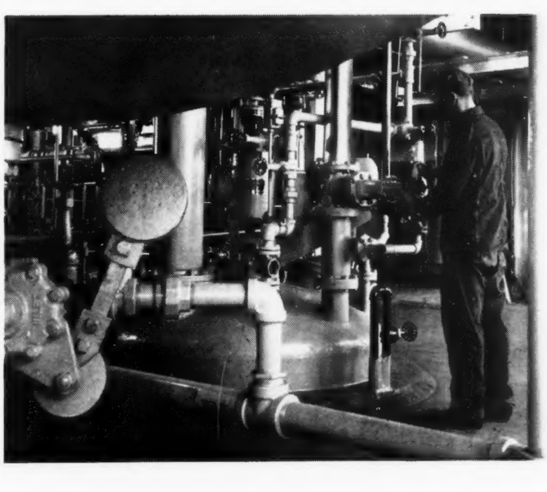

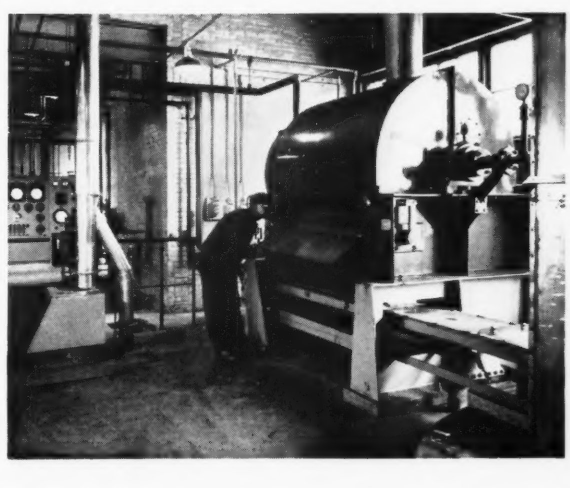

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RUBBER WORLD

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Editorials

From Now On It's "RUBBER WORLD"

BEGINNING with this issue, readers will note the absence of the word *India* from the name of this publication. From now on it will be called RUBBER WORLD, not India RUBBER WORLD.

We feel that the name *India rubber* should no longer be used to denote rubber, as such. *India rubber* was the name developed in England in the Eighteenth Century. The word *rubber* resulted from the use of this then relatively new material by the English chemist, Joseph Priestley, for removing lead pencil marks from paper, and the word *India* was joined with *rubber* because the West Indies, where Columbus found the natives using the substance in various ways, was for a while thought to be India. Hence the word or words *India rubber* have been used for many years.

The word *India* is no longer synonymous with the West Indies, and India is not a major source of supply of natural rubber. In addition, almost half of the world's annual consumption of new rubber is now chemical rubber, and our publication, serving the "Rubber World," should not continue to use a word that no longer has any significance.

Synthetic Rubber Research—Primary Need Is for a National Policy

THE lead article in this issue is a further contribution on the overall subject of the future of research on synthetic rubber and is notable in that it makes the point that what we need first is a national policy so that various industry and government proposals can be evaluated. The author, J. H. Faull, Jr., is a consultant to the Navy Department's Office of Naval Research. His paper was given before the Army-Navy-Air Force Elastomer Research and Development Conference in Washington in January, as was the paper on the same subject by H. J. Osterhof, Goodyear Tire & Rubber Co., published in our May issue. Dr. Faull's views are his own, however, and are not to be taken as those of the Navy.

Although proposals for future research on synthetic rubber have been made by spokesmen for both government and industry, it is difficult to determine if there is any substantial area of agreement. Industry has taken the position that it can and will do all the research necessary after the government plants are sold except where the only objective is to serve a military need. Primary military needs, as defined by Faull, involve elastomers to be used in weapons systems having extreme operational requirements, and development of an elastomer replacement for natural rubber that can be produced domestically in time of national emergency.

These two primary military needs might require a rather extensive and long-term program of fundamental and applied research which would therefore have to be done by government.

The Rubber Producing Facilities Disposal Commission has been charged with the responsibility for a policy for future research on synthetic rubber, and it is suggested further in the Faull article that the Commission should ask the National Academy of Sciences to set up an advisory group to study the problem. When and if the extent of future government research on elastomers is determined, the industry would be better able to evaluate its own research needs.

In his acceptance speech on being awarded the 1954 Willard Gibbs Medal of the American Chemical Society's Chicago Section in May, Elmer K. Bolton, for 21 years director of the du Pont company's chemical department, urged industry, particularly in the chemical field, to place more emphasis on fundamental research, but he added:

"Industry can never hope to do more than a small fraction of the basic research so indispensable to the country's progress."

It is for just this reason that we have been urging for several months now that fundamental research on elastomers, because it is long term and costly in nature, should be done on a national rather than an individual company basis. Preferably, it should be done under the direction of one or more eminent scientists, none of whom has been a direct employe of either the government or the rubber industry in the recent past, but who is familiar with the problems by virtue of work done on elastomers under contract for either government or the industry.

The Disposal Law permits continuation of the fundamental, non-industrial part of the government's present research program until mid-1956, but policy should be formulated in the interim, and provisions made for whatever program extension the nation needs, in the time that remains.

R. G. Seaman

Future Military Elastome[r Res...]

Sargent Studio

J. H. Faull, Jr.

THE extent and the nature of the deficiency in elastomer research and development, as the consequence of termination of the Office of Synthetic Rubber, Reconstruction Finance Corp., research program after disposal of the government synthetic rubber producing facilities, are difficult to predict.

The need of an overall national policy on elastomer research and development before various government or industry proposals can be evaluated is emphasized.

It is suggested that the Rubber Facilities Disposal Commission assume the responsibility for development of such a policy, and that the Commission ask the National Academy of Sciences or some other suitable agency to formulate a national policy for elastomer research for the long-term future.

NATIONAL security requires a practical policy for elastomer research programs following disposal of government synthetic rubber producing facilities. Public Law 205,[3] presently in effect, provides for this disposal in the near future. With such disposal, half or more of the government sponsored elastomer research will terminate. During the past few years several proposals based on several different concepts of national interest have been offered with regard to the future sponsorship of this considerable research activity, the most recent one in this trade publication.[4] During this same period, however, the critical need of more knowledge of the underlying science has become clearer; intensive short-term experimental effort has not achieved the set goals either in weapon systems or natural rubber stockpile need. It was undoubtedly with some recognition of this situation that P. L. 205[3] provided in Section 9 (a) (7) and in Section 10[3] for two reports on continuing government research needs, if any, on elastomers.

Need of Policy Now

Unfortunately neither the objectives nor program content of the national security need has been well enough defined or widely enough agreed upon to permit adoption of any proposal so far presented. Serious doubt of adequacy has arisen over the proposal that industry can and will provide all the necessary scientific research of the more fundamental type. It is the thesis of this presentation that *a research policy must be established* before proposals can be considered.

With the first report of P. L. 205 due in January, 1955, a first opportunity is at hand to formulate and present such a policy. Provisions of P. L. 205 permit interim continuation of the research and development program of the Office of Synthetic Rubber, Reconstruction Finance Corp., in question, insofar as the fundamental nonindustrial part is concerned, until about the middle of the calendar year 1956. In the interim, however, governing policy needs to be formulated and provision made for whatever program extension, if any, the nation needs. Within recent weeks (prior to January, 1954) several statements have been issued indicating that the government recognizes its responsibilities for continuing research and development programs. Such statements have been issued by the Department of Defense, the Department of Commerce, and the National Science Foundation. It thus seems likely that if termination of the OSR program results in a research deficiency affecting national security, a practical policy is needed to identify the deficiency and to suggest workable corrective measures. Such a policy proposal should find acceptance.

Military Needs Involved

Two critical military needs are involved: (a) the need of elastomers to be used in weapon systems having extreme operational requirements, and (b) the need of an elastomer replacement for natural rubber, which can be produced domestically in time of national emergency. The calculated military risk involved in the natural rubber stockpile is at stake. Likewise at stake is the huge cost burden of the stockpile, still needed in spite of synthetic elastomers now known. Both of these military needs derive vital support from the OSR program, and disposal of the synthetic rubber producing facilities without replacement of the OSR research program devoted to military needs can weaken the overall military program seriously. A sound, active policy could not only prevent this undesirable outcome, but could provide for a substantial acceleration of the present military program.

The total OSR program is presently (January, 1954) in excess of $5 million per year, or roughly double the total military elastomer program. Of this $5 million total, it has been estimated that perhaps $1½ million can be considered as supporting military program needs as defined above. Also within the OSR program there is an additional $1- or $2-million effort carried on by competent research teams which might well become available; if they should become available and the work could

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[1] Presented at the Joint Army-Navy-Air Force Elastomer Research and Development Conference, Washington, D. C., Jan. 12, 13, 1954.

[2] Consultant to the Office of Naval Research, Navy Department, Washington, D. C. The opinions or assertations contained herein are the private ones of the writer and are not to be construed as reflecting the views of the Navy Department.

[3] Public Law 205—83d Congress, Chapter 338—1st Session, Aug. 7, 1953. "Sec. 9 (a). Not later than thirty days after the termination of the negotiating period provided for in section 7 of this Act, and in no event later than January 31, 1955, the Commission shall prepare and submit to the Congress a report setting forth—

"(7) a program for the continuance, to the extent it deems necessary during the fiscal year following the fiscal year in which the transfer period terminates, of the research program on synthetic rubber and its component materials then being carried on by the operating agency:

"Sec. 10. At the expiration of one year after the transfer period or as soon thereafter as the Congress is in session, the President shall report to the Congress concerning the Nation's rubber requirements and resources, and the need, if any, for further research by the Government relative to the production or use of synthetic rubber and its component materials.

"Sec. 11. The term 'rubber-producing facilities,' as used in this Act shall not include the Government-owned evaluation laboratory at Akron, Ohio."

[4] India RUBBER WORLD, May, 1954, p. 197.

Research Program; Effect of Government Facilities Disposal Act of 1953[1]

J. H. Faull, Jr.[2]

be reoriented, the military program might be accelerated to that extent.

The balance of the OSR program is so closely associated with production activity that it will be continued appropriately or even expanded by the expected purchasers of the synthetic rubber producing facilities. The figures mentioned in the previous paragraph have not included any differentiation between types of research. Obviously, until a policy has been determined, it is impossible to state how much fundamental research or how much applied research effort can be used to maintain or strengthen the military program.

It should be emphasized here that for the most part the "military program" referred to in this paper is "supported" or "strengthened" by the research in question regardless of sponsorship, whether this be a military agency, some other government agency, or an industrial establishment. Much of the more fundamental research might better be done outside of military agency sponsorship; much research may be held commercially attractive and hence properly supported by industry. The policy called for in this paper should include a sound prediction of how needed work will be sponsored; the unprovided-for balance can then be identified for disposition and should be a matter of direct military concern.

The OSR Research Program

A closer examination of the OSR research program reveals certain features which constitute important considerations relative to disposition of the program:

(a) Fundamental and applied studies in polymerization, synthesis, and polymer properties are producing results which contribute directly to the solution promise of a number of the most important military elastomer projects. Some of the major topics include studies of new monomers; new catalyst systems for polymerization; mechanism of polymerization, especially by free radicals; new monomer combinations for polymer formation; thermodynamic properties; new non-aqueous polymer systems; theory and nature of polymer degradation, including deterioration in use or storage.

(b) Much of the research is carried on in university laboratories or research institutes. Support of such work frequently presents problems best solved by government sponsorship; some institutions and many scientists prefer government grants or contracts instead of support by a commerical organization; this point is particularly true for the more fundamental science work where it is the uncommitted investigator (but purposeful and oriented) who provides the only possible leadership. It should not be overlooked that such leadership in these projects is often of exceptional competence, not found elsewhere, or always available.

(c) The government facility at the University of Akron provides polymerization services not available elsewhere in the government. Its replacement cost would be high. This facility and its program are government equities in the elastomer research and development field. A policy formation for the future use of this facility is tacitly required by provisions of P. L. 205.[3] A sound recommendation for any continued government operation or use of this facility seems impossible without a prior policy in respect to elastomer research (especially the more fundamental type) such as urged in this paper.

(d) Even in the fundamental and applied phases, a substantial portion of the OSR research program carried on at universities and institutes reflects and serves the elastomer production function of OSR. Since, after disposal, there will be no such active government production function, projects of this kind would not be expected to find any justification for government sponsored extension. It should, however, be noted that the project leadership at these universities and institutes might be willing, and would certainly be competent, to reorient to other elastomer objectives.

Accomplishments of the OSR research and development program have been published extensively in the literature and are thus available for study. On July 3, 1953, OSR released its latest and most complete list[5] containing about 700 titles covering all publications of its work of the past 12 years. In the table below an attempt has been made to show how the subject matter of these publications is divided among conventional research and development categories and what part of each came from industry contract sources.

OSR Publications by Research Type and Showing Industry Contracts

Category	Total Number	Number from Industry Contract	Approximate Fraction of Total Due to Industry Contracts
Fundamental	264	13	1/20
Applied	216	65	1/3
Development	88	42	1/2
Test evaluation	23	9	1/3
Staff releases (mostly RFC)	130	—	—

This tabulation may contain some surprising information, even after allowing for some personal bias in making the classification. The categories are listed in decreasing order of interest to military programs. It is the continuation of work such as that of the first two categories, i. e., fundamental and applied research, which is at issue following disposal. The question is whether or not industry will sponsor continuation of work not presently under its contract supervision, and whether or not it will continue to sponsor the work in a manner to meet the needs of national security. It is to be noted that national security may require both continuation of projects already supporting military objectives and, where opportunity offers, reorientation of other projects in this direction.

[5] "Chronological List of Technical Papers from the Government Synthetic Rubber Program," Research and Development Divisiion, Office of Synthetic Rubber, RFC, Washington, D. C. (DPR-5, July 3, 1953).

Faull Comment on Osterhof Paper

THIS Faull article is essentially the same as that presented on January 13 and to be published in a forthcoming report on the proceedings.[1] Publication of the article by H. J. Osterhof,[4] makes additional comment desirable.

It is his thesis that industry will provide enough of the needed fundamental research to make a government program unnecessary, and assurances of this attractive outcome are obtained from an understanding of the concept of "pioneering research," as practiced by industry and illustrated by the several new commercial elastomers provided during the past 20 years. Excepted were special military needs, where material volume was unprofitably small; with the primary need, as presented by Osterhof, being for applied research and development, with a negligible fundamental type of research appropriate or desirable in this case.

Osterhof states "that enough fundamental research will be carried out by private industry to keep pace with all the possible demands on an expanding synthetic rubber industry," and further emphasizes that the industrial incentive is documented by the widely accepted Paley Report[6] prediction of doubled United States rubber consumption by 1975.

In contrast, this Faull article cautions against optimism for the efficacy of the Osterhof proposal. It is not possible to cite a national policy on elastomer research by which the Osterhof proposal or any other proposal can be judged. Some grave possible weaknesses in both the assumptions and expectations of the Osterhof proposal are indicated. Hence the major premise of the accompanying article is the immediate need of a policy decision on elastomer research so that the several proposals may more properly be evaluated.

The Osterhof plea for definition and informed use of research category terms is well taken. His decription of "pioneering research" as practiced by industry, is admirably set forth in the first several paragraphs under the heading, "Industry Accomplishments in Pioneering Research." The argument based on this concept and its use in industry research is felt to be weak, however, for the following reasons:

1. The argument implies that little useful fundamental research comes from outside this industry system of "pioneering research"; so other sources are of little consequence. One does not have to deny or discourage fundamental research on the part of industry to observe that most fundamental knowledge of the underlying science upon which technology is based comes from other sources; it should be demonstrated more completely before acceptance that this generalization does not hold for the rubber industry.

2. Apparently Osterhof's "applied" research includes all work directed to a specific goal. Tacitly implied is that if there is a specfic goal, no effort supporting it need be of the more fundamental type.

Where does this leave the natural rubber problem? There is no place for direct attack on this problem under the head of "pioneering" research. Yet it would be a gross error for anyone today to suppose there is enough of the underlying science known to map out a route for the synthesis of natural rubber in vitro.

3. The problem of a completely adequate synthetic replacement for natural rubber will be the biggest unfinished project left over from the Office of Synthetic Rubber research program after disposal of the producing plants. This "fact-of-life" is avoided in the Osterhof argument by an implied union of this objective with that of the industry objective in meeting the Paley Report prediction of double rubber consumption and production by 1975.

If the prediction by the Goodyear Tire & Rubber Co.[7] that natural rubber is preferred for 35% of the rubber industry's products, is continued until 1975, then the entire expansion in demand can be met by expansion of production of current GR-S types (plus the known specialty synthetic elastomers) without any further progress being made in the problem of providing an adequate synthetic substitute for natural rubber.

Certainly industry needs no outside research incentive to accomplish the objective of vastly increased synthetic elastomer production by 1975! Real industrial incentive for the research leading to an adequate synthetic substitute for natural rubber will come only *after* the plantations are no longer able to provide for the 35% preferred use—a long time in the future and hardly to be considered a basis for industry research incentive at the present time.

4. The bright hope that "pioneering research" will solve the natural rubber problem by itself and most efficiently, is based on the thought by Osterhof that materials research makes progress by a series of exploratory excursions into fields in which not much work has been done, and where an educated guess indicates a likelihood of profitable discovery or invention, but where the work will not be handicapped by an exact decription of a material as a goal. So far, at least three materials have turned up which may eventually prove leads to an adequate substitute for stockpiled natural rubber; if they do, the natural rubber problem, as a national security research need, disappears; but today it must be said that such an outcome may be remote or even nonexistent.

5. In addition, "pioneering research," as pictured by Osterhof, is by no means the only research concept embracing fundamental research, even in industry. In the very modern field of synthetic biologically active agents (penicillin, cortisone, nucleic acids, etc.), where the initial research proceeds by isolation of a pure principle, determination of detailed composition, synthesis of specific structures and compositions, the place of fundamental-type research does not disappear because of a precise picture of the synthetic goal. The situation is simplified because often the sought-after biologically active agent turns out to be a single chemical substance rather than a material, as in the case of natural rubber; this fact in itself should not discourage establishment of a long-term fundamental research program aimed at obtaining knowledge of the underlying science so much needed for the solution of the natural rubber problem.

6. The situation with regard to fundamental research on special elastomers for the military also gives evidence of the inability of an "applied research" program (always short term) to solve the weapons problem any better than the strategic supply problem. It appears to be even more important now than several years ago that basic research needs to be tied closely to a government elastomer program for the future.

To conclude with an anonymous paraphrased statement from one of the country's foremost industrial rubber "pioneering research" scientists:

"It should not be difficult for government and industry scientists to sit down with their advisers and lay out the appropriate areas of responsibility in research, including especially research of the fundamental type, for the national need. All kinds of research could then find their proper distribution and the change of that distribution with time which would be satisfactory and freely adopted by both government and industry."

WE NEED THE POLICY!

Basis for Continued Government Research

Justifications for any large government research effort need to be reviewed carefully and frequently. It is a widely and properly held view that many government research programs should be deficiency programs, i. e., they should be created only when it becomes clear that national needs will not be met otherwise.

It is difficult, however, to predict the nature of such future research deficiency. It may be worthwhile to inquire about the location of incentives for support of elastomer research, in order to make a prediction about the adequacy of industry support or about the necessity of extended government support. In the case of elastomers for new weapons having extreme operational requirements, the need will be met through effort, if successful, directed to discovery or invention of materials having suitable properties. Such materials may have limited commercial applicability and would be produced only as needed for military use. Certainly, incentives for industry to support expensive programs for such discovery or invention are meager and unreliable.

A similar lack of industrial incentive may exist in the case of a synthetic elastomer replacement for natural rubber for production in time of emergency. When such a material becomes available, it will be possible to avoid the calculated military risk and cost burden of the natural rubber stockpile. The market for such an elastomer might be small, however, except in time of emergency. This conclusion is, of course, based on certain assumptions regarding cost or quality of the unknown elastomer; at present the research promise in the field will probably justify these assumptions.

There are some possibilities, on the other hand, whose realization could suddenly change this situation. For example, the effort spent on low-cost polyisobutylene rubbers might some time lead to a material able to replace the natural rubber stockpile need. Also, higher priced materials currently under commercial development for specialized uses might be shown to accomplish the same result, or unceasing synthesis of new monomers and their use, either alone or in combination, may produce the ultimate in a synthetic elastomer replacement for natural rubber. But as time goes on, without profitable issue, industrial research appropriations for the specfic national security need sought here may soon find declining incentive.

The government has a clear incentive, however, arising from the inescapable responsibilities for military preparedness and for carrying the continuing heavy expense of the natural rubber stockpile; this expense amounts to tens of millions of dollars a year, with no prospect of relief. These are compelling incentives for a fairly large and long-term program of research.

This government research program could quite appropriately be devoted to a wide range of fundamental science investigations. The foundation for the basic facts of underlying science is not likely to be laid or enlarged on short-term studies within boundaries too closely perceived in advance, and long-term research may require little applied or development support for a long time.

A policy recommending emphasis on a long-term program should allow for such factors as availability of competent leadership and the promise of valuble contributions from the proposals as they are offered. If such programs are the best prospect to meet the national security needs, it seems likely that much of the incentive for sponsorship will be found in government. It seems no less than prudent to anticipate a research deficiency after disposal.

[6] "Resources for Freedom, The President's Materials Policy Commission," U. S. Government Printing Office, Washington, D. C. (June, 1952).
[7] India Rubber World, Nov., 1952, p. 245.

In conclusion, therefore, the consequence of termination of OSR research and development after disposal of government synthetic rubber producing facilities will be a deficiency in elastomer research. The extent and the nature of this deficiency are difficult to predict. It will be reduced by industry research sponsorship and activity. Its nature will be defined by national needs which are partly military, partly other national security, and partly other national needs. The 12-year-old OSR research and development program is a large and exceptionally effective and adaptable one, especially in its university and institute projects. It is a government equity, part of which offers a ready-made opportunity for acceleration of other critically important programs. Unfortunately there is at hand no formula by which the problem of the OSR research and development program can be resolved after facilities disposal, while retaining maximum value for the national security.

Advisory Committee on Policy Recommended

It is therefore recommended that a competent group be organized to determine the country's needs for elastomer research and development and to indicate how best these needs can be met, with special reference to the OSR program mentioned in P. L. 205. I believe that the Commission set up by P. L. 205, already operative, is best suited to assume this task and can best approach its objective by asking the National Academy of Sciences for advice on the best measures for discharge of its research and development responsibilities. The responsibilities referred to here are those of policy formation regarding research for the long-term future.

The National Academy is preferred over other competent organizations because of its experience, its detachment, the immediate availability of top experts among its membership, and its ability to form a truly national policy. Initial study by the Academy might lead to recommendation of an advisory group representing the government and national interest; if so, a continuing study could be provided by contract. This, it appears, is an opportunity for important, long needed policy formation—at present open only to the Commision; time is short for its accomplishment. If the Commission is unable to exploit this opportunity, P. L. 205 provides for a later report by the President in which consideration of ". . . the needs, if any, for further research by the government . . ." is specifically required. Unfortunately, however, the due date of this report coincides with termination of the research chiefly in question.

Thus, it is recommended that the Commission should interpret its interest and responsibility as covering the whole broad field of elastomer research and development, since it seems likely that the policy it formulates will have far-reaching consequences for all government elastomer research programs for many critical years ahead. The recommendation is equally applicable and pressing whether the National Academy of Sciences or other suitable agency is selected to formulate a national policy of elastomer research.

Goodrich Gets Sixth Tubeless Tire Patent

A patent covering an improved inner liner which adheres to the inside surface of tubeless tires without use of adhesives has been granted to The B. F. Goodrich Co., inventor of the tire. This is the sixth such patent granted to the company; the others covered the airtight lining, sealing ridges, and sealant.

A New, Unvulcanized Composition of Resin and Rubber Having High Impact[1]

R. J. McCutcheon[2] and H. S. Sell[2]

UNCURED blends of a new type of styrene resin and any chloroprene rubber have been found to have good tensile strength, high stiffness, and heat distortion points of 190° F. and above.

An outstanding feature of these blends is their high impact strength in the uncured state. Most elastomer and conventional resins blends cannot achieve high impact strength without cure. Good hardness and excellent flexibility for 50/50 blends are also important advantages.

THE use of styrene-diene copolymer resins as reinforcing and processing aids is well known in the rubber industry (1-7).[3] While busily engaged in reinforcing studies in rubber stocks, the compounder has searched for materials and methods by which he could bridge the gap between resins and elastomers (8). Less familiar, but perhaps equally desirable, is the field where resins are dominant, and elastomers function as plasticizers, each contributing to the other in an almost symbiotic manner. Since the development of hard, tough stocks is so closely related to the resin component, the evolution of these stocks should start with the resin.

Such was the case when, in 1927, Bruson, Sebrell, and Calvert (9) discovered that natural rubber could be cyclized with halides of amphoteric metals, thereby producing a hard resinous material known as Pliolite.[4] This resin, per se, did not bridge the gap between the resin and elastomer fields, but did attract the attention of chemists. Of the many varied investigations, one was directed toward the union of this resin and an elastomer in vulcanized blends (10). The scope of this investigation by H. R. Thies was concerned both with vulcanized and uncured resin/rubber blends in ratios ranging from 10/90 to 90/10 and disclosed that tensile, stiffness, and hardness increased with the resin content. The inherent toughness and high impact of these cured blends were shown by their use in applications such as football helmets and cover stocks for golf balls. This was the situation prior to 1941.

The exigencies and concomitant priorities of World War II dictated the use of less critical materials. In 1946, Borders, Juve, and Hess described the effects of blending a styrene-diene copolymer resin with GR-S and other rubbers (11). In substance, except for the resin, this work duplicated that described earlier (10), with tensile, hardness, and stiffness directly related to the resin content; the desirable impact and toughness of these compounds, like those described by Thies, were achieved after 20% or more of rubber, based on the resin content, had been added, and the resulting blend vulcanized.

Others have described this type of stock (12-13). Thus for the most part the work until very recently has shown that the desirable properties of the resin and rubber blends are dependent on co-vulcanization. The data in Table 1 are sufficiently adequate to describe this past work. These data show that the stiffness, hardness, and tensile in a blend are functions of the resin. Elongation, abrasion resistance, and impact, which becomes significant when at least 20 parts of rubber have been added, appear as functions of the rubber component.

TABLE 1. CURED HIGH STYRENE RESIN BLENDS WITH GR-S (12)

Pliolite S-6[4]	90	85	80	75
GR-S	10	15	20	25
ZnO	5	5	5	5
Sym. dibeta naphthyl paraphenylene diamine	2	2	2	2
Stearic acid	2	2	2	2
Benzothiazyl disulfide	1	1	1	1
Tetramethyl thiuram disulfide	.12	.12	.12	.12
Sulfur	2	2	2	2
Cure: 40'/290° F.				
Tensile strength, #/in²	6360	5680	4870	4140
Ultimate elongation, %	0	0	0	35
Shore D hardness	80	77	76	72
Unnotched impact, ft-lbs/in.	2.6	3.3	8.7	>16.7
Olsen stiffness,* in.-lbs.	5.68	5.52	4.0	3.36
Taber abrasion, cc/500 rev., 1000 gm. wt., H-22 wheels	.299	.249	.237	.213

*Moment (load in pounds x span in inches) necessary to produce 90-degree bend in a 1- by 0.075- by 4-inch section. Measured with Olsen stiffness tester (ASTM D-747).

Other Vulcanized Resin-Rubber Blends

The most recent work in the field of high impact stocks is again concerned with vulcanized blends in ratios where the quantity of resin used increases to, but is never greater than, the amount of elastomer used, and where the amount of sulfur employed is in the range of that used in semi-hard and hard rubber compounds (14). This work shows that it now is possible to produce stocks of high hardness in the range of ebonite, but with far greater impact strength and without the attendant and disagreeable exothermic reaction accompanying hard rubber vulcanization.

Most of these prior blends thus described can be processed on conventional rubber equipment. All of them attain their optimum properties in a cured state. The mixing of these stocks, which contain curing ingredients, can be a problem and require some caution, for their

[1] Presented before the Division of Rubber Chemistry, A. C. S., Sept. 10, 1953, Chicago, Ill.
[2] Chemical products development, The Goodyear Tire & Rubber Co., Akron, O.
[3] Numbers in parentheses refer to Bibliography items at end of this article.
[4] Trade mark of the Goodyear company.

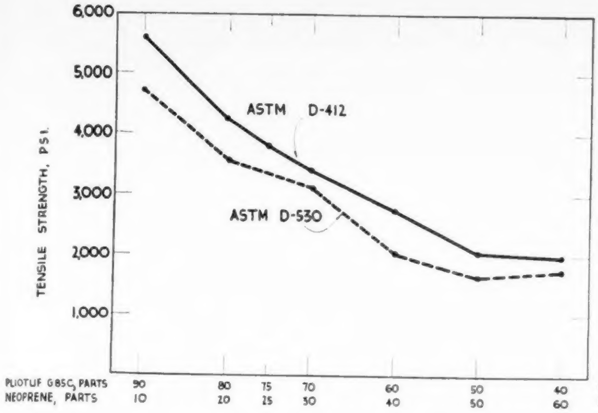

Fig. 1. Effect of Various Combinations of Resin/Rubber on Tensile Strength. ASTM Methods for Rubber and Plastics Both Used

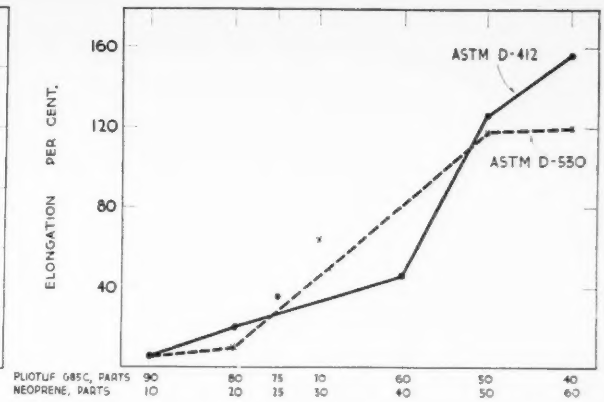

Fig. 2. Elongation at Break for Resin/Rubber Combinations

processing temperatures are very close to vulcanizing temperatures. Too, the disposition of cured scrap is a problem. When vulcanized scrap is used, it deteriorates the high impact strength of the stock.

Because of these difficulties in vulcanized blends, a blend requiring no cure would be desirable. Unfortunately the successful, vulcanized blends do not function in the same manner when uncured (13), and the solution has been evasive. Only one such blend has been described. It is identified as a blend of styrene-acrylonitrile resin and an acrylonitrile rubber (15). With this exception, the work to date apparently has been with vulcanized blends.

New Unvulcanized Blends

Recently a new resin and rubber blend has been developed which requires no cure and has several outstanding and useful properties. This blend combines a new type of styrene resin called Plio-Tuf G85C,[4] and any chloroprene rubber, such as Neoprenes GN, GNA, AC, KNR, WHV, and W; of these, type W is preferable for light-colored blends. For this discussion only the resin-like ratios between 90/10 and 40/60 of resin to neoprene will be considered. These limits give a family of blends which show a great range in stiffness. That such blends possess some degree of uniqueness may be shown in several ways.

First, if a styrene-acrylonitrile resin is blended with a neoprene rubber, or if a nitrile rubber is blended with Plio-Tuf G85C, the resulting blends have impact strength considered unsatisfactory, being approximately 1.0 and 1.2 foot-pounds per inch of notch; whereas the Plio-Tuf G85C-neoprene blend has impact strengths at least 600% greater.

Secondly, vulcanization of blends of various elastomers

TABLE 2. VULCANIZED BLENDS OF PLIO-TUF G85C AND ELASTOMERS

Plio-Tuf G85C	75.0	75.0	75.0	75.0	75.0
Neoprene	25.0				
Smoked sheets		25.0			
Butyl			25.0		
GR-S 1006				25.0	
Chemigum[4]					25.0
Stearic acid	1.0	1.0	1.0	1.0	1.0
Zinc oxide	5.0	5.0	5.0	5.0	5.0
Magnesium oxide	7.0				
Altax* (benzothiazyl disulfide)		1.0	.5	1.6	1.0
Methyl Tuads* (tetramethyl thiuram disulfide)			1.0		
Sulfur		2.0	2.0	2.0	2.0
	113.0	109.0	109.5	109.6	109.0
Cure: 5' @ 325° F.					
Notched impact, ft-lbs/in.	1.5	4.7	0.3	9.2	0.7

*R. T. Vanderbilt Co., Inc., 230 Park Ave., New York 17, N. Y.

with Plio-Tuf G85C in most cases, except for GR-S 1006, does not show the high impact value obtained in an uncured 75/25 blend of Plio-Tuf G85C and neoprene. Data for cured blends are shown in Table 2.

ASTM[5] methods of test used to obtain the data reported in this paper were as follows: stress-strain, D-412-51T and D-530-50T; hardness, D-676-49T; impact strength, D-256-47T; stiffness in flexure, D-747-50; and heat distortion, D-648-45T.

The uniqueness of these blends is shown further in Table 3, where Plio-Tuf G85C is blended uncured in 75/25 ratios with several common elastomers.

TABLE 3. UNCURED BLENDS OF PLIO-TUF G85C AND ELASTOMERS

Pliolite S-6	75					
Plio-Tuf G85C		75	75	75	75	75
Neoprene	25	25				
Chemigum N-4[4]			25			
GR-S 1006				25		
GR-I 15					25	
Smoked sheets						25
Notched impact, ft-lbs/in.	1.0	6.3	1.2	2.6	0.5	1.6
Heat distortion, 66 psi. °F	152	195	210	210	197	206
Shore D hardness	78	77	75	73	63	71

The data show that 75/25 resin/neoprene blends have a high impact. Neoprene is a high-gravity elastomer, and a comparison on blends, where the neoprene is adjusted to an equal volume basis with GR-S, shows even more strikingly the effectiveness of the resin blend with neoprene. These data are shown in Table 4.

TABLE 4. UNCURED BLENDS OF PLIO-TUF G85C AND NEOPRENE ADJUSTED TO AN EQUAL VOLUME BASIS

Plio-Tuf G85C	75	75	75
GR-S 1006	25		
Neoprene		25	32.7
Shore D hardness	73	77	78
Heat distortion, 66 psi. °F	210	195	201
Notched impact, ft-lbs/in.	2.6	6.3	12.3

The data thus shown justified further evaluation in ratios from 90 parts of the resin and 10 of neoprene to 40 of resin and 60 of rubber. In order to present more effectively several properties of this family, the data are shown graphically in a series of figures.

Tensile Strength

Figure 1 shows the effect of various resin/rubber ratios on the tensile strength of the blends. Because the 90/10 ratio is closer to the plastic field, whereas the 40/60 ratio is more closely representative of rubber compounds, the tensile strength and elongations were determined both under ASTM D-412[5] and ASTM D-530[5]. The range shows tensile limits of approximately 5,400 psi. for a 90/10 and 2,000 psi. at a 40/60 ratio when tested under ASTM

[5] American Society for Testing Materials, 1916 Race St., Philadelphia, Pa.

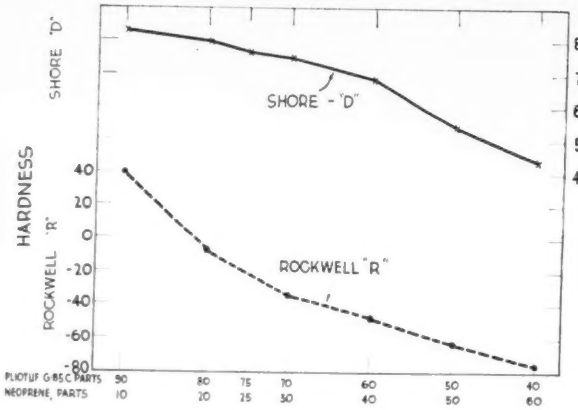

Fig. 3. Hardness of Resin/Rubber Combinations by Shore and Rockwell Instruments

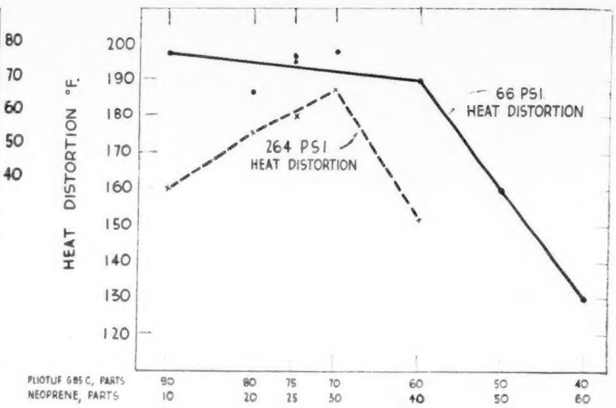

Fig 4. ASTM Heat Distortion Results

D-412 and about 4,700 and 1,700 psi., respectively, under the conditions imposed by ASTM D-530. In the 75/25 ratio, where the impact strength is quite evident, the average tensile is approximately 3,500 pounds per square inch.

Elongation

Elongations are shown in Figure 2 and indicate a trend of increasing elongation as the resin content is reduced. The elongations range from less than 10% at the 90/10 ratio to 120-150% in the 40/60 resin/rubber ratio. At the 75/25 ratio, the elongation is 30-40%.

Hardness

Figure 3 shows the hardness range in these stocks. Because both the plastics and rubber field are involved, two types of measurements were made. Correlation with the rubber industry is made through the shore D durometer readings, and the plastics industry through the Rockwell hardness. For purposes of this comparison the Rockwell penetrating ball was kept constant, and values of the actual hardness were allowed to pass through the zero point and become negative values.

The 40/60 resin/neoprene ratio gives a Shore D reading of 44, which is the approximate hardness of shoe sole and rubber flooring stocks. The 90/10 ratio is considerably harder, the Shore D value of 83 is only a few units lower than readings normally obtained on styrene resins alone.

Heat Distortion

Standard ASTM heat distortion values are shown in Figure 4. These data show that the 66 psi. heat distortion of 90/10 to 60/40 resin/rubber ratios are quite high, being approximately 190° F. or above. The lower values for the 50/50 and 40/60 ratios probably are due to the transition of the stock from a predominately resin-like to quasi rubber-like state. However, the 160° F. value of the 50/50 ratio probably is satisfactory in many applications.

Impact Strength

The high impact strength of these blends is one fundamental phenomenon which distinguishes them from uncured elastomer blends with conventional reinforcing resins which cannot achieve high impact without a cure. Figure 5 shows the notched and unnotched Izod impact strengths obtained from uncured blends of Plio-Tuf G85C and neoprene. The notched Izods show values ranging from 0.6-foot-pound per inch of notch for the 90/10 ratio to 12.7 and 6.7F for the 50/50 and 40/60 ratios, respectively.

Where the suffix "E" is used, it denotes that the test does not give a true value since the sample bent under the force of the hammer; a suffix "F" denotes that the stock was too soft. The notched Izod shown is 7.8 foot-pounds for the 75/25 ratio. This single result does not necessarily reflect the true value, for in one study 12 samples were tested and gave an average of 9.7 foot-pounds/inch of notch.

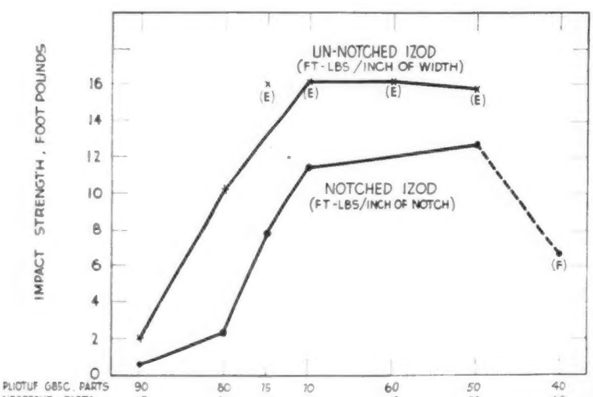

Fig. 5. Notched and Unnotched Impact Strength of Resin/Rubber Blends. "E" Denotes Sample Bent under Hammer. "F" Means Stock Was Too Soft

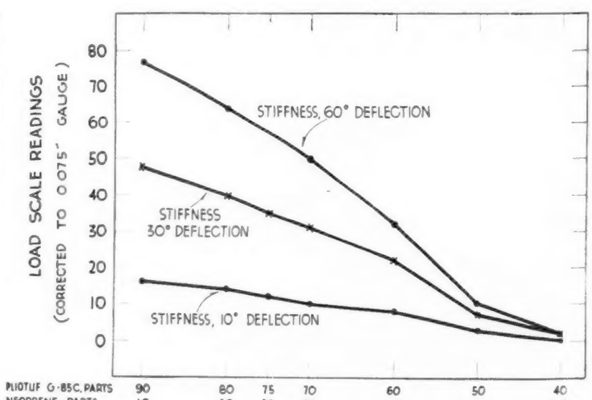

Fig. 6. Olsen Stiffness Results (8 In.-Lb. Wgts., 4-In. Span; One-In. Width @ 77° F.)

Olsen Stiffness

To show the relative effect of the various ratios on stiffness, Olsen stiffness data are plotted in Figure 6. As might be expected, the curves show that the stiffness of the compound appears to be a function of the ratio of resin to rubber; the higher the resin content, the greater the stiffness. For purposes of reference, the 90/10 ratio could be considered slightly less stiff than polystyrene, and the 40/60 ratio approximately the stiffness of polyethylene.

Oil and Water Absorption

Oil and water immersion data are shown in Figure 7. The data indicate that water absorption is relatively low and apparently independent of either component. Conversely, the percentage increase after 70 hours' immersion in ASTM #3 oil at 158° F. apparently indicates that this swell is a function of the neoprene component rather than the resin and shows that the resin itself is superior to the neoprene in resistance to this oil.

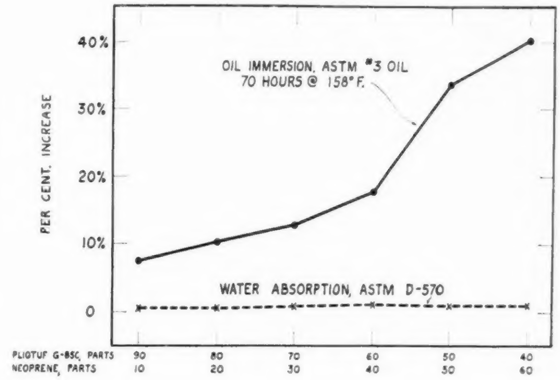

Fig. 7. Oil and Water Absorption of Resin/Rubber Blends

180° Bend Test

One interesting property observed in the lower resin, higher neoprene ratios was the unusual hand-feel of the blends. In a 50/50 ratio, for example, the blend sheeted quite smoothly from the mill and, when cooled, had a leather-like toughness with a "warm" feel. Figure 8 shows a comparison between uncured 50/50 ratios subjected to a bend of 180 degrees. Notice that the stock made from GR-S and a styrene reinforcing resin is rough and has shown severe cracking. Vulcanization of this stock corrects the tendency to break on bending. This tendency to break is not evident in an uncured 50/50 blend of Plio-Tuf G85C and neoprene.

Mixing Procedure

The ratios thus described may be made by proportionate blending of resin and neoprene on conventional rubber or plastics mixing equipment. If this blending is done on mills, the resin should be banded on the rolls at approximately 250° F. and the rubber added in very small increments until approximately 10-15% has been blended, after which the neoprene may be added more rapidly. The principal difficulty that may be encountered is that too-rapid addition of the rubber may chill the resin sufficiently to permit it to drop from the rolls. This is not the case in Banbury mixing where the materials may be blended very easily. In this case the neoprene and the resin may be added simultaneously in a hot Banbury, and the blending accomplished rapidly and thoroughly.

Summary and Conclusions

When mixed under these conditions, the resulting blends of Plio-Tuf G85C and any of several kinds of neoprene show good tensile strength, high stiffness, and heat distortion points of 190° F. or above. Table 5 summarizes two fundamental properties of these 75/25 resin-neoprene ratios. The data show that high impacts and the general properties discussed in this paper may be obtained in uncured stocks having high hardness if any of several types of neoprene are used with Plio-Tuf G85C.

TABLE 5. UNCURED BLENDS OF PLIO-TUF G85C AND VARIOUS NEOPRENES

Plio-Tuf G85C	75.0	75.0	75.0	75.0
Neoprene, parts	25.0	25.0	25.0	25.0
Neoprene, Type	GN or GNA	AC	KNR	W
Izod impact, range in foot - pounds / inch of notch	7.8–9.7	8.9–10.1	7.7–10.3	7.3–10.2
Shore D hardness	79	79	79	78

The authors are grateful to the Goodyear Tire & Rubber Co. for permission to present this paper.

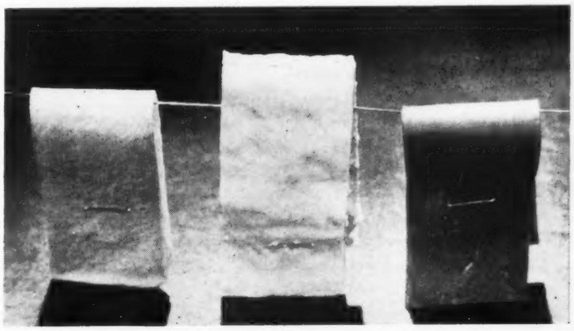

Fig. 8. Comparison of 50/50 Resin/Rubber Blends after 180-Degree Bending. Center Is GR-S and Styrene Resin, Uncured; on Left Is GR-S and Styrene Resin Cured; on Right Is Uncured Plio-Tuf G85C and Neoprene

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(15) L. E. Daly, U. S. patent No. 2,439,202 (1948).

[6] Abstract only.

Nylon Tire Repair Kits

TIRE repair units with two-ply nylon patches cut in a sawtooth pattern are being marketed by Seiberling Rubber Co., Akron, O. Five such units for low-pressure car tires are currently available, and kits for truck tires are scheduled for the near future.

Said to be half the weight, but stronger than conventional four-ply rayon patches, the nylon patches reduce the "thump" usually resulting from the rayon repair sections. The sawtooth edge design distributes destructive forces over a greater area, Seiberling further declares, by increasing the total edge length.

Applications of Butyl Rubber: Present and Future[1]

W. H. Peterson[2]

THIS year marks the eleventh anniversary of the commercial application of Butyl rubber. During this time it has become the preferred material for inner tubes. It is now becoming the preferred material for other applications because it is more versatile than any of the other existing rubbers. Let us consider why this is so.

It is well known that natural rubber or GR-S has the capacity to use large volumes of sulfur, and that they can be cured to almost any degree of hardness. This is because they have a great amount of unsaturation.

Butyl is different in this respect since great care is exercised in its manufacture to keep the unsaturation very low. Butyl has approximately 3% of the unsaturation of natural rubber. This low unsaturation is responsible for its excellent resistance to the attack of oxygen, ozone, and various chemicals.

THIS article and the one by R. M. Thomas published in May complete the present-day story on Butyl manufacture, research, and applications.

Practically all automotive inner tubes in the United States and Canada are made with Butyl rubber. Butyl applications other than inner tubes have grown steadily since 1947 and are continuing at a rapid pace today.

The new hot compounding of Butyl with carbon black provides vulcanizates with increased tensile strength and modulus, improved resilience and reduced hysteresis, better abrasion resistance, chemical resistance, and electrical properties, when compared with conventionally mixed compounds. Calender and extruder operations are also improved.

This new compounding technique should enable the compounder to make present products better and contribute to the development of new products for the future.

Table 1. Properties of Butyl Which Are Responsible for Its Acceptance in Commercial Applications

	Aging	Abrasion Resistance	Tear Resistance	Flex Resistance	Impermeability to Gases	Chemical Resistance
Cements & Adhesives	X					
Wire & Cable	X	X				
Tire Curing Bags & Bladders	X		X	X		
Inner Tubes	X		X	X	X	
Coated Fabrics	X	X		X	X	X
Belts, Hose & Tubing	X	X	X	X	X	X
Mechanical Goods	X	X	X	X	X	X

In Table 1 we have illustrated the excellent aging properties which contribute to the quality of every product made with this polymer.

Some Current Applications

The use of Butyl in the manufacture of cements and adhesives has been steadily growing because of this good aging.

The wire and cable industry accepted Butyl as a promising insulation rubber while it was still a laboratory curiosity. Their interest was centered on Butyl's excellent ozone or corona resistance in addition to its electrical properties which are equivalent to those of natural rubber. Butyl is also used in the wire and cable industry for the jacketing of heavy cable where abrasion resistance is a factor.

The low degree of unsaturation in Butyl offers increased service life in rubber products such as tire curing bags that are subjected to high temperatures for long periods of time. The bladder of the Bagomatic tire curing press[3] is a very severe application for rubber. Here the heat, tear, and flex resistant properties of Butyl make it the only polymer which will do this job satisfactorily.

The inner tube has been and continues to be the largest single outlet for Butyl. Butyl is superior to natural rubber for this application in aging. The tear resistance of a Butyl tube remains at a high level throughout the life of more than one tire. Ability to hold air, of course, is an exceptional property with Butyl. An

Fig. 1. Butyl coated glass fabric irrigation ditch liner which has performed satisfactorily in Utah for five years

[1] Presented before the Northern California Rubber Group and The Los Angeles Rubber Group, Inc., on Oct. 1 and 6, 1953, respectively.
[2] Enjay Co., 15 W. 51st St., New York 19, N. Y.
[3] McNeil Machine & Engineering Co., 90 E. Crosier St., Akron 11, O.

inner tube made with this polymer holds air approximately ten times better than a natural rubber tube. This property of Butyl is responsible for the success of low-pressure tires. Constant air pressure also results in greatly increased tire mileage.

The coated fabrics industry is another field where the properties of Butyl are improving quality. Double-texture fabrics for convertible auto tops, double-coated fabrics for heating pads, hospital sheeting, etc. are being made which give better service to the consumer.

One illustration, which brings out the sunlight resistance of Butyl, has been demonstrated in an experimental installation of a Butyl coated fabric as an irrigation canal lining material.[4] This installation was made by the Soil Conservation Service at Logan, Utah. (See Figure 1.) The Butyl coating after five years of constant exposure to the elements maintained its original properties and showed no signs of sun checking or deterioration of the surface.

Although the use of Butyl in the manufacture of belts, hose, and tubing is not widespread, it shares a portion of this business. For example, conveyor belts which are required to handle hot materials have performed well because of the good heat aging, tear resistance, and flex properties of Butyl. Other examples include steam hose and chemical hose and tubing.

Probably the fastest growing field has been in molded mechanical goods. Here Butyl offers exceptional properties which make it easier to meet quality requirements. Products such as axle or body bumpers made of Butyl will outperform those of natural rubber or GR-S in such applications. Good molding properties make the manufacture of intricately designed rubber products attractive. The good hot tear resistance reduces the percentage of rejects on mold removal. Molded Butyl parts were first used on an automobile in 1946. Since that time, performance has been so good that one manufacturer is now using approximately 10 pounds of Butyl per car.

Grades Available

All Butyl produced in this country is manufactured in government owned plants. Sales are handled by the Office of Synthetic Rubber, Reconstruction Finance Corp., Washington, D. C. The product is sold in a convenient 50-pound package.

Two types of package are being used. One which has the polymer wrapped in a polyethylene film is the most commonly used since polyethylene readily disperses into the compound without adverse effect as long as mix temperatures exceed 260° F.

Table 2. Grades of Butyl Commercially Available

	MOONEY PLASTICITY	OZONE RESISTANCE	HEAT AGING	CURE RATE
GR-I-35	38 - 47	EXCELLENT	GOOD	SLOW
GR-I-50	41 - 49			
GR-I-15	41 - 49			
-17	60 - 70			
-18	70 +			
GR-I-25	41 - 49	GOOD	EXCELLENT	FAST

The other, which has the polymer in a coated carton, is used for mill mixing or for the manufacture of cements. This eliminates the necessity of higher temperatures which are not readily attained on open mill mixing and prevents the occurrence of undissolved particles in cement.

Grades of Butyl which are currently available from the government plants are listed in Table 2.

GR-I-35 is the least unsaturated and, therefore, the most resistant to chemical attack. Its ozone resistance is of particular importance to the wire and cable people for the insulation of high voltage where corona cracking is a problem. Unfortunately this type is slow curing.

GR-I-50 is slightly faster curing, but still low enough in unsaturation to make it desirable where superior resistance to oxidation and chemical attack is required.

GR-I-15 is even faster curing and is used extensively where plasticizer addition is kept to a minimum.

GR-I-17 and 18 are grades of a comparable cure rate which are most commonly used in the manufacture of inner tubes. These grades are of a higher viscosity and are, therefore, more suitable for compounding with up to 25 parts of plasticizer.

GR-I-25 has the most unsaturation of all and is, therefore, the fastest curing. It is best for heavy-gage products, such as tire curing bags, steam hose, and various molded mechanical goods.

Compounding and Processing

The handling of Butyl in a factory is done in pretty much the same manner as with natural rubber or the other synthetics. Butyl stocks may be mixed on an open mill or in a Banbury. The high degree of nerve in the pure gum state causes Butyl to lace and fall from the open mill roll until the pigment reinforces the polymer. When more than one batch of the same compound is being open mill mixed, a leader from a previous batch will assist mill mixing considerably.

Butyl is very easily handled on the Banbury. It is customary to overload the chamber approximately 10% on a volume basis, which insures good dispersion and a rapid mix.

Because Butyl, unlike other rubbers, does not break down on mill mastication, it offers an advantage to the processor. A Butyl compound changes in plasticity only to the extent of the temperature attained in processing. This advantage is a distinct one which results in a more constant gage of calendered and extruded articles.

In both of these operations Butyl processes best at temperatures higher than those used for most rubbers. Experience has shown that most of the processing problems in Butyl can be overcome by going to higher temperatures. Butyl calenders best at temperatures between 200 and 225° F. Most Butyl stocks perform best in the extruder at temperatures above 250° F.

Butyl, because of its relatively low unsaturation, is considerably slower curing than the other rubbers. Its low unsaturation makes it more difficult for the sulfur to seek out the spots for vulcanization; therefore, curing at higher temperatures reduces the time required and generally insures having the adequate state of cure for the best properties of the vulcanizate.

This point brings up one precaution which must be exercised with great care when Butyl and other rubbers are handled in the same factory. Butyl is not compatible with the other rubbers in the sense that it will not co-vulcanize with natural rubber or any of the other synthetics, with the possible exception of neoprene. The difference in unsaturation of Butyl and the other rubbers is so great that only a small percentage of a highly un-

[4] Utah State Agricultural College, Agricultural Experiment Station, Logan, Utah. Bulletin 363, October, 1953.

saturated polymer in a Butyl compound is sufficient to prevent a proper cure.

Consumption Distribution

In 1953 consumption of Butyl was at a rate of one pound per capita. How is this quantity used? Let us look at the approximate distribution of Butyl since it was first commercially produced a little more than 11 years ago. Table 3 shows the percentage distribution of Butyl to transport and non-transport items.

TABLE 3. ANNUAL CONSUMPTION (LONG TONS) U. S. PRODUCED BUTYL

		% Distribution				% Distribution	
Year	Butyl	Transport	Non-Transport	Year	Butyl	Transport	Non-Transport
1941...	0			1948...	54,800	97	3
1942...	20			1949...	50,800	96	4
1943...	300			1950...	61,400	96	4
1944...	10,800			1951...	68,000	95	5
1945...	43,000			1952...	69,000	93	7
1946...	79,200	97	3	1953...	77,000	92	8
1947...	68,800	98	2				

The transport items include inner tubes, valves, tire curing bags, and bladders. Note that more than 95% of the total Butyl produced has been consumed in the manufacture of such items.

Note also that the non-transport items have been consuming Butyl at an increasing rate each year since 1947. The usage of Butyl in this field, however, has been restricted by a lack of availability of polymer and by the absence of technical service. The acceptance of Butyl in this field has, however, continued to expand on the merits of the inherent properties of the polymer itself.

In Table 4 we have shown the estimated consumption of Butyl in non-transport items for 1952 and 1953.

TABLE 4. ESTIMATED CONSUMPTION OF BUTYL* (1952 AND 1953) NON-TRANSPORT ITEMS

	1952		1953	
	Long Tons	Approx. %	Long Tons	Approx. %
Mechanical goods, including automotive	1,700	34	1,805	30.0
Wire and cable	1,100	22	1,540	25.4
Coated fabrics	1,000	20	1,100	18.0
Cements	350	7	668	11.0
Hose and tubing	300	6	300	5.0
Packings	150	3	150	2.5
Athletic goods	150	3	270	4.5
Household goods	150	3	150	2.5
Miscellaneous	100	2	67	1.1
	5,000	100	6,050	100.0

*U. S. produced Butyl only. Imported Butyl not included since consumption breakdown not available.

Butyl is being used commerically in the manufacture of automotive mechanical goods, wire and cable, coated fabrics, cements, hose, packings, athletic goods, and household and miscellaneous products not classified. This wide acceptance of Butyl for a diversified line of rubber products is growing rapidly and will expand still further when additional supplies are available for these end-uses.

New Butyl/Carbon Black Hot Compounding

Those of you who have worked with Butyl know that it has certain deficiencies such as hysteresis, resilience, rebound, and stiffening at low temperatures. These deficiencies have limited its usefulness. As reported previously by R. M. Thomas,[5] the Standard Oil Development Co. has discovered a new compounding technique which offers promise of overcoming these limitations.

[5] India RUBBER WORLD, May, 1954, p. 203.

This new method of compounding, based on the thermal interaction of Butyl with carbon black, gives improvements both in processing and in ultimate properties. These factors will have an important effect on improving the qualities of many items now made from Butyl. It will also widen Butyl's application in the industry.

We have already done a considerable amount of work in the factory and have successfully obtained good thermal interaction between Butyl and carbon black in Banburys which range in size from the 3A through the 27.

In Table 5 is a suggested procedure for obtaining thermal interaction in a factory Banbury.

TABLE 5. BANBURY CYCLE FOR THERMAL INTERACTION OF BUTYL

CHANNEL BLACK		FURNACE BLACK	
TIME (MIN.)	INSTRUCTIONS	TIME (MIN.)	INSTRUCTIONS
0	ADD ALL BUTYL.	0	ADD ALL BUTYL.
2	ADD ALL BLACK, STEARIC ACID AND POLYAC.*	2	ADD BLACK, STEARIC ACID AND PROMOTER.
6	MIX COMPLETE - TEMP. APPROX. 270°-280°F.	6	MIX COMPLETE - TEMP. 270°-280°F.
10	TEMP. APPROX. 380°F.	8	TEMP. APPROX. 325°F.
20	DUMP - TEMP. NOT OVER 450°F.	18	DUMP - TEMP. NOT OVER 375°F.
ALLOW BATCH TO HEAT SOAK ON DEAD MILL FOR 10 MINUTES BEFORE SHEET OFF.		ALLOW BATCH TO HEAT SOAK	

*E. I. du Pont de Nemours & Co., Inc., Rubber Chemicals Division, Wilmington, Del.

Depending upon the condition of equipment, the temperature of cooling water, and possibly other factors, certain adjustments may have to be made to obtain maximum efficiency. It may be necessary, for example, to adjust batch size and conditions of the mix to obtain the proper temperatures for a given time interval. Initial mixes were made at the plant of Farrel-Birmingham Co., Inc., Ansonia, Conn. These manufacturers of Banbury equipment say that there is no problem of lubrication as long as heat is not brought in through the gear box. In all of the factory runs that we have made, the temperature of the batch has been brought up by power consumption alone and then regulated by cooling water. In no case has it been necessary to add heat to the Banbury.

Table 6 compares the physical properties of a Butyl vulcanizate containing a high plasticizer content with a vulcanizate from the thermal interaction method without plasticizer.

TABLE 6. COMPARISON OF PROPERTIES—REGULAR MIX vs. THERMAL MIX

	15 Pts. Forum 40*	6 Cycles Heat Treatment
Absolute damping	−54%	−52%
Tensile strength	−15%	+11%
Modulus @ 300%	−48%	+87%
Elongation	+11%	−12%
Processing	Good	Excellent

*Esso Marketers, 15 W. 51st St., New York 19.

Note that the absolute damping of a Butyl vulcanizate may be reduced 54% by the addition of 15% of a paraffinic oil plasticizer to the compound. This results in a 15% loss in tensile and a 48% loss in modulus with a slight increase in elongation.

With the thermal interaction product, you get about

the same decrease in absolute damping. Owing to the absence of plasticizer, tensile strength is increased 11%, and the modulus is increased 87% with only a slight decrease in elongation. The processing behavior of heat treated compound is also greatly improved.

The comparison in both compounds (Table 6) is with a control compound made without plasticizer or heat treatment.

Many of you will recall difficulties experienced with Butyl tubes back in 1947. Many new Butyl tubes installed during winter months in the northern part of this country and Canada developed cold buckles after relatively short mileage. After a considerable amount of research and study, the Standard Oil Development Co. laboratories not only determined the cause of this trouble, but also learned how to correct it. This improvement was accomplished by increasing the state of cure, reducing the internal viscosity by changing to a coarse-particle carbon black, and increasing the plasticizer content. In order to tolerate more plasticizer, the higher Mooney GR-I-17 and GR-I-18 type of polymers were developed. Today practically all inner tubes are made with these high Mooney polymers. Although these tubes perform satisfactorily under the extremes of both hot and cold climates, a sacrifice in physical properites, tensile, and tear resistance was made.

Had we known this new heat treating technique of compounding in the earlier days of Butyl, cold buckling of Butyl tubes would not have been a serious problem. Now we have a tool for improving the properties of this inner tube by increasing its tensile strength and tear resistance without making any sacrifice in its low-temperature behavior.

A tire curing bag made of Butyl will give on the average twice as many heats as one made of natural rubber. Use of Butyl in this application is presently restricted because of difficulties encountered in building. In spite of this drawback many tire manufacturers are using Butyl for conventional tire curing bags, and to the best of our knowledge it is the only acceptable rubber for the bladder in the Bagomatic press[3]. The new system of compounding Butyl with heat, which results in a lower Mooney viscosity of compounded product, will make it easier to build a curing bag by existing methods..

During the last few years the use of Butyl in the manufacture of molded mechanical goods has been increasing. Butyl compounded with the thermal interaction system, because of improved physical properties, will accommodate a wider range of specifications.

The increase in resilience obtained by this mixing technique permits the use of Butyl in additional applications. It also gives the rubber compounder an opportunity to furnish Butyl parts having a wider range of damping properties than have been possible in the past.

Most of the Butyl used today by the wire and cable industry is for power cable insulation; although some is used for jacketing, where good abrasion resistance and low-temperature flexibility are required.

Heat Treatment Improves Extrusion

The excessive nerve in Butyl compounds restricts its use in applications where high extrusion speeds are required. It is known that some carbon blacks will improve the extrusion characteristics of a Butyl compound.

All blacks, however, have an adverse effect on the electrical properties. In studies made at our laboratory it has been found that heat treatment of carbon black and Butyl improves dispersion and increases the electrical resistance. It is believed that these compounds diluted with an electrically inert filler might be adaptable to some types of insulation.

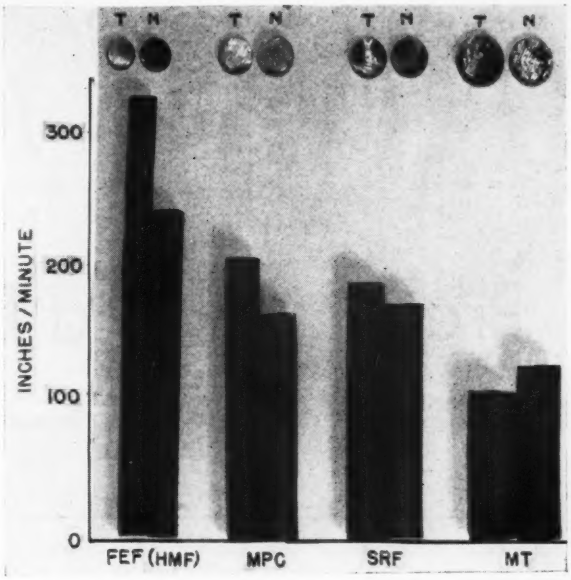


Fig. 2. Extrusion of Butyl stocks containing various carbon blacks, each stock prepared by normal and thermal mixing. Basic compound: GR-I-35, 100; black, 60. Circular cross-sections at top of illustration show thermal mix compounds have less swell and less porosity. T equals thermal mix, and N equals normal mix

Figure 2 illustrates the extrusion characteristics of four types of carbon blacks in GR-I-35.

Using 60 parts of black and thermally interacting this with the Butyl in a Banbury indicates that FEF (HMF) black, the best extruding black of the four from a normal mix, is further improved by the thermal interaction. This compound, you will note, increases from 240 to 330 inches per minute in extrusion rate. This improvement in processing is of value in many applications and is certainly of interest to the wire and cable industry. Note from the cross-sections at the top of this slide that in general the thermally interacted compounds have less swell and are less porous than the regular mix.

These masterbatches were later diluted with fresh Butyl and Whitetex[6] to obtain compounds containing 15, 30, and 45 parts by weight of black per 100 parts of polymer with a total pigment load of 90 parts on the Butyl. The improvement in processing, although diminished by the dilution, was still noticeable and worthy of investigation on a factory scale.

Butyl Tires

Many attempts have been made to evaluate the good properties of Butyl in tires. Early results indicated that shortcomings of poor abrasion and high hysteresis more than offset the good properties of aging.

During the past two years, experimental tires have been built and tested. It now appears that satisfactory tires can be made of Butyl. Under controlled test conditions in several localities, many of these experimental tires showed better resistance to abrasion than the LTP GR-S controls. The Butyl tires also showed complete freedom from sidewall and tread groove cracking together with exceptional resistance to cutting and chipping.

Other features of experimental Butyl tires which are rather difficult to measure accurately are those associated with improved riding qualities. All drivers of test cars equipped with Butyl tires report better ride, freedom from road noises, and ease of steering, however.

(Continued on page 436)

[6] Southern Clays, Inc., 33 Rector St., New York 5.

DEPARTMENT OF PLASTICS TECHNOLOGY

Preforming and Preforming Presses[1]

Byron B. Belden[2]

ALTHOUGH there are four general types of preforming presses, each with its own features and advantages, proper setting-up of the press and proper die design are equally important in achieving satisfactory plastic preforming operations.

Uniform weight of preforms requires homogeneous powders, proper rate of press operation, elimination of bridging in the feeder, and proper location of cavities in a multiple-cavity die.

Preforming of fine powders is improved by modifying stroke of press to allow escape of entrapped air. A hydraulic press with mechanical feeder is being developed to handle high-impact molding powders.

AS a rule, preforming is usually associated with thermosetting plastic materials which are to be molded. The main reasons for preforming are as follows: (1) to reduce the bulk of the material; (2) to obtain the correct amount or weight of material for any given charge; (3) to facilitate loading of the mold by the molding press operator; (4) to raise the density of the material so that it may be preheated dielectrically; and (5) in the case of irregularly shaped molds, to reduce material flow and mold wear by providing a preform of nearly the same shape as the molded part.

Types of Preform Presses

Preform presses in general use can be classified into four types, as follows:

(1) Hydraulically operated presses (see Figure 1). These presses generally have production rates, in terms of strokes per minute, that are lower than those of mechanical preform presses, but can be designed to make a larger preform by weight. The application of these units is usually limited to a single purpose, such as making preforms for television cabinets.

(2) Rotary presses (see Figure 2). These are mechanically operated units generally having from 15-33 die sets mounted in a rotating member and having a production rate of 250-1,200 preforms per minute. Since multiple-die sets are necessary, the rotary press is usually limited to applications involving high productions of preforms having the same weight and shape (usually round). Good examples of such preforms are those used to mold buttons.

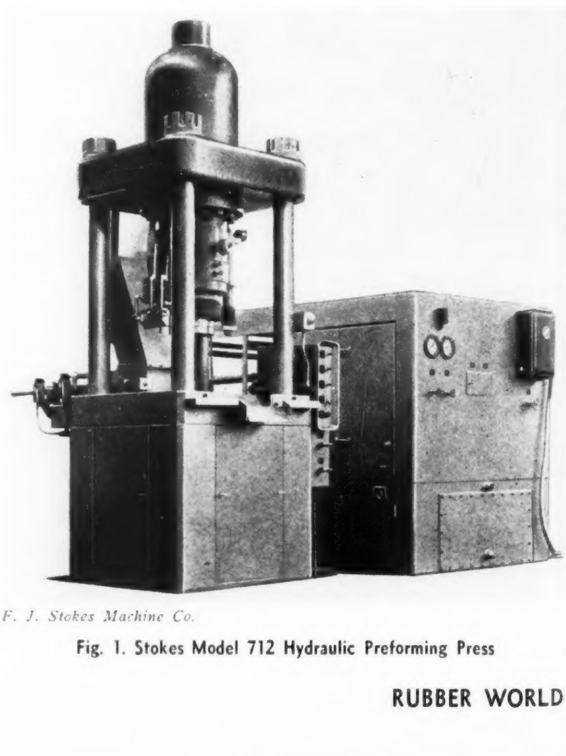
(3) Eccentric-type presses (see Figure 3). With these units the top punch is mounted on a slide connected directly to a crank above the die table. These presses are suitable for making relatively large preforms at rates of about 15-50 strokes per minute.

(4) Reciprocating-type presses (see Figure 4). The head is mounted on four rigidly guided columns and operated by a mechanism located below the die table. Presses of this type are available in rated capacities of 60-200 tons and operating ranges from 20-60 strokes per minute.

The four-column reciprocating press has proved to be one of the most flexible and popular in use today. Its construction lends itself to the use of multiple-cavity dies, with the four columns providing rigid alinement of the punches with the die. The presses have feeder mechanisms designed to provide a smooth reciprocating motion, thereby minimizing the tendency of the plastic material to become packed in the chute.

Press Set-Up

In operating any preform press, it is good practice,



F. J. Stokes Machine Co.

Fig. 1. Stokes Model 712 Hydraulic Preforming Press

[1] Presented at the eleventh annual conference, Pacific Coast Section, Society of the Plastics Industry, Inc., Coronado, Calif., Mar. 12, 1954.
[2] Application engineer, hydraulic press and power tool engineering department, Baldwin-Lima-Hamilton Corp., Eddystone Division, Philadelphia 42, Pa.

after installing a set of dies, to turn the press through one complete cycle by hand before attempting to operate it under power. A check should be made to make sure that the punches are properly alined with the die, and that the top punch clears the feeder shoe.

One of the easiest ways of determining the correct depth of fill setting, when setting up a preform press, is to weigh a charge of loose plastic material, manually place the charge in the die, and adjust the lower punch until the die is level-full. Of course some adjustment will be required when the machine is placed in operation to compensate for variations in pourability of the material.

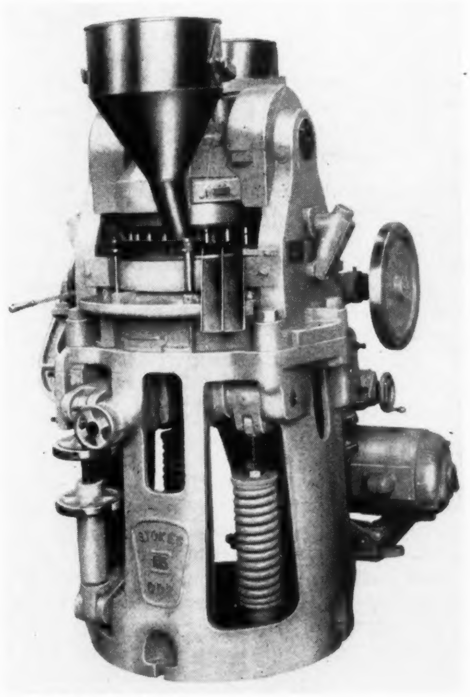
Most general-purpose thermosetting materials have a bulk factor in the 2:1 or 3:1 range; so it is advisable to set the top punch initially so that it will enter the die to a depth slightly less than half that of the fill setting. It is usually best to have the preform weight or depth of fill adjustment set before adjusting the top punch to produce a dense preform. This will prevent the press operator from reducing the weight of the preform by raising the bottom punch to reduce the fill without first raising the top punch and thereby avoid one of the most common causes of jammed presses.

In order to be handled with a minimum of weight loss or breakage, and to be dense enough for efficient preheating, most materials should be pressed to approximately 80% of maximum density. We have determined that 8-10 tons per square inch of pressure are required for general-purpose phenolic materials, and 10-12 tons per square inch for urea and melamine materials.

Preform Die Design

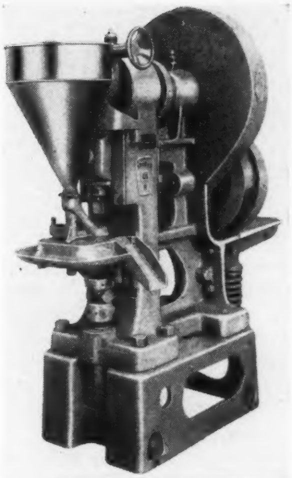
Proper design of preform dies is an important factor in obtaining good preforms. A properly hardened steel with very smooth or polished surfaces should be used for the dies, and there should be proper taper and suitable allowances for top and bottom punch clearances.

We recommend that the die be made of an air harden-



F. J. Stokes Machine Co.

Fig. 2. Stokes Model DD-2 Rotary Preforming Press



F. J. Stokes Machine Co.

Fig. 3. Stokes Model R Preforming Press Has Eccentric-Type Single-Punch Action

ing high-carbon tool steel containing approximately 12% chromium. The high chrome content aids in obtaining good depth of hardening, withstanding the side pressures set up when the material is being compacted, and providing good wearing qualities. The die should be hardened to Rockwell "C" 58-62. The upper and lower punches should be made of a tool steel specifically designed to withstand repeated impact loads and be hardened to Rockwell "C" 56-60.

The clearances between the punches and die will vary somewhat according to the type of material being compacted. A good rule to follow, however, is to allow a minimum of 0.002-0.004-inch clearance between each side of the bottom punch and the die.

For general-purpose phenolics we have found that a taper of 0.001-inch per inch on the sides (0.002-inch per inch on the diameter) will aid in ejection of the preforms and prolong the life of the die. For urea and melamine materials we have found it necessary to taper the sidewalls of the die as much as 0.003-inch per inch (or 0.006-inch per inch on the diameter) in order to eject the preforms from the die. This taper allows the preforms to expand, as they are being ejected, and helps prevent chipping of the bottom edges of the preforms.

It is also desirable to chamfer the top edge of the die cavity 45 degrees and 1/16-inch deep. Polishing the die axially to remove grinding marks will also aid in preform ejection.

In most cases chromium plating the sidewalls of the die cavity will prolong die life. Chrome plating, however, is not a substitute for using quality steel in the die and can never be stronger than the material used to back it up.

When it is known that a particular preform die will be used extensively, or will handle an exceptionally abrasive material, it is advisable to consider lining the die with a carbide insert. In general, carbide-lined dies will wear about 10 times longer than the best steel. Care must be taken when installing or removing a carbide-lined die to prevent chipping or cracking of the liner.

Preform Weight Variations

Difficulty in maintaining uniform weight of preforms is a common problem, and is caused by several factors. If the weight tends to change every few minutes rather than from preform to preform, it is likely that the coarse and fine particles of material have separated during

shipment. In this case, mixing the material by drum rolling will alleviate the problem.

If the weight varies from one preform to another, it is possible that the press is being operated too quickly to allow the material to flow into the die. Sometimes the feeder on its return stroke tends to drag material back out of the front part of the die cavity. This condition can be alleviated by relieving or venting the front edge of the feeder shoe.

Some materials tend to segregate as they flow down the feeder. Placing a baffle inside the feeder to divide it into two or more compartments will help this condition. As a rule, the feeder should be brought forward as far as possible without striking the upper punch. This position keeps the loose material over the die for the maximum time.

When warranted by production, specially designed feeder shoes can be used. The ideal condition for general-purpose materials is to have the feeder shoe nearly the same size as the cavity in the preform die. This keeps all of the material moving with each stroke of the press and helps prevent bridging of material in the shoe.

When multiple-cavity dies are used, the cavities should be in a single line to minimize weight variation of preforms. When it is necessary to have more than one row of cavities, they should be staggered and spaced as evenly as possible.

The method of feeding material into the hopper of the preform press will often affect the weight of the preforms. Care should be taken to distribute the material in the hopper as uniformly as possible.

If the preforms shatter during ejection from the die, it is advisable to check the die to see if a belly has developed at the spot where the material is compresssed. This condition usually occurs when an improper grade of steel has been used to make the die and often causes severe overloading of the ejection mechanism. We believe that at least 80% of abnormal breakdowns of preform presses can be traced directly to the die.

Where the shape of the mold or transfer pot permits, we recommend that rectangular preforms be used. Rectangular dies permit the production of larger preforms and make it easier to control preform weight.

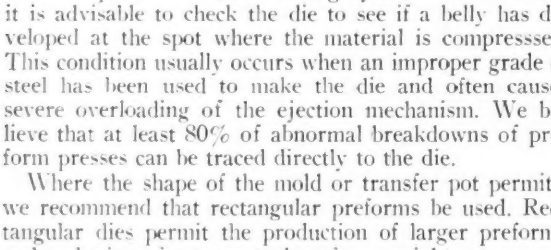


Fig. 4. Baldwin-Defiance Model 20 Reciprocating-Type Preforming Press

Preforming of Fine Powders

The preforming of fine powders (material that will pass through a 300-mesh screen) is of great interest to molders, particularly makers of plastic dinnerware, because products made from such powdered material have a better surface finish.

We have found it possible to preform fine powder by stopping the press after the top punch has entered the die and partially compressed the material, then restarting the press automatically by means of a timer, and completing the normal cycle. The dwell time resulting from the interrupted stroke permits escape of the air normally contained in the powder. Preforming fine powder without a dwell time in the stroke causes the air to become entrapped in the preform and results in laminated preforms.

The necessary dwell time varies from 0.3-1 second, and the procedure usually involves the provision of greater than normal clearances between the top punch and the die.

The biggest problem we have encountered in preforming fine powder is in the feeding and handling of the powder. Agitation must be provided inside the feeder and hopper to prevent bridging or packing of the material. With agitation the powder becomes loose and flows almost as freely as water, thereby creating the problem of controlling the flow to prevent the powder from boiling out of the front of the die cavity while the feeder is retracting. Work is being done on this problem.

Preforming of Impact Materials

The medium or improved impact materials have presented numerous problems in preforming. Some of these materials are rather fluffy and, therefore, difficult to feed automatically. We have developed an agitator feeder that works quite well on some materials. This feeder is not completely trouble-free; we refer to it as a gadget, but, with proper attention, it will do a reasonably good job.

It has been proved impossible to handle the high-impact materials on our standard mechanical preform presses. We have designed a hydraulic press with a mechanical feeder to handle these materials. This press is still under development, but the project looks promising, and we hope to complete it this year.

Summary and Conclusions

Preform presses can be classified into four general types, each with its own features and advantages. There is much more to preforming, however, than the choice of a press. Proper setting-up of a press for a run, with regard to depth of fill setting, is an important factor, as is the question of die design.

Proper die design involves use of a suitable tool steel properly hardened, the provision of adequate clearances, taper, and chamfer of the top edges of the cavity, and consideration of chromium plating and the use of carbide liners.

Variations in preform weights can be caused by several factors such as separation of the material into coarse and fines during shipment; too rapid operation of the press; bridging of the material in the feeder; and improper location of cavities in a multiple-cavity die.

The problem of preforming fine powders can be solved by interrupting the stroke of the preform press to allow escape of entrapped air. The preforming of medium- and high-impact materials is still a problem. The use of an agitator feeder has given some good results with medium-impact materials. A hydraulic press with mechanical feeder is under development to handle high-impact materials.

Meetings and Reports

SPE Sections Meet

Expandable Polystyrene Beads

THE May 19 dinner-meeting of the New York Section, Society of Plastics Engineers, featured a talk and a demonstration on "Expandable Polystyrene Beads," by E. A. Edberg, Koppers Co., Inc., and was held at the Gotham Hotel, New York, N. Y., with about 90 members and guests present. Section Chairman Harold H. Schwartz, Empire Brushes, Inc., presided and announced there would be no business meeting. He then turned the meeting over to the program chairman, Alan K. Zimmerman, Monsanto Chemical Co., who introduced the speaker.

A new development in expanded plastics, expandable polystyrene beads, is now undergoing intensive field evaluation by the chemical division of Koppers Co., and Mr. Edberg emphasized that the material was no laboratory curiosity. The beads, available in a free-flowing, high-density form, may be shipped to point of use and then expanded with heat to a foam of desired shape and density. This new polystyrene foam is characterized by low cost, high strength, closed cell structure, excellent thermal insulating properties, toughness, low water absorption and water vapor permeability, and low dielectric loss.

These properties make it particularly adaptable in the fields of insulation, buoyancy, sandwich construction, packaging, electronics and toys, novelties and displays, where its unique ability to be molded to shape is of particular advantage. Under certain conditions the beads can be foamed in place.

The techniques of molding are simple; relatively low pressures are adequate, and inexpensive molds and presses may be used. The speaker demonstrated the molding of spheres about three or four inches in diameter in a Carver press in a light mold of the steam chest type; that is, openings were provided in the mold cavity for the entrance of the steam required by the beads for the molding operation. If the beads are molded in closed steam, some water is introduced with them. Back pressure on the mold was stated to be between 10 and 50 psi., when about 25 psi. gage steam pressure is used for molding. The use of saturated, but not heavy condensate steam and controlled venting of the steam through the parting line are additional important molding technique factors. Exhibits included expanded polystyrene floats, toys, and examples of sandwich construction. An active question and answer period followed the talk and demonstration.

Table favors were distributed by courtesy of Plastic Molders Suply Co., and the meeting concluded with a drawing for door prizes which were contributed by Empire Brushes.

Panel on Steel for Molds

A combined meeting of the Philadelphia, Pa., sections of SPE and SPI was held April 27 at the Franklin Institute in that city, with approximately 90 members and guests in attendance. Following dinner, W. H. Kemper, of Carpenter Steel Co., headed a panel which discussed various steels recommended for use as construction materials for plastic molds; such steels were described prior to the discussion in a paper entitled, "Plastic Mold Steels."

Extrusion and Injection Molding

Papers entitled "Diagnosis of Extruder Troubles," by Ernest C. Bernhardt, of E. I. du Pont de Nemours & Co., Inc., and "The Effects of Injection Speed on Large Molded Parts," by Paul E. Schmidt, of St. Regis Paper Co., were given before about 125 members and guests at the May 12 meeting of the Newark Section.

Dr. Bernhardt, whose address was based on a paper he delivered before the SPE National Conference in Toronto, outlined a simplified extruder flow equation for determining the capacity of the metering section of an extruder and the pressure discharge characteristics of an extrusion machine. He stated that the formula has been the most successful method devised so far for attacking these extrusion problems.

Mr. Schmidt, advising that injection speed is of special importance when molding thin parts that have a large area, elaborated on the experimental work which has been done by his company. Such problems which were discussed by the speaker as having been investigated included the economic considerations of obtaining improved efficiency from higher speeds of injection at the cost of additional equipment such as weigh-feeders, preplasticizing units, etc.; the optimum speed of injection molding; the detrimental effects on the molded piece from higher speeds; and the question of whether newly designed injection molding machines actually produce higher injection speeds.

Door prizes from Rohm & Haas, Lionel Corp., and H. Muehlstein & Co., Inc., and table favors from Modern Molders were distributed to the audience.

Panel Discussion at Cleveland

"Plastics in the Processing Industry," a panel discussion headed by W. Von Fischer, head of the Chemical Engineering Department, Case Institute of Technology, was featured at the May 17 meeting of the Cleveland-Akron Section, SPE. The dinner-meeting, with 150 persons attending, was held in conjunction with the Process Industry Group of the Cleveland Engineering Society in its building in Cleveland, O. Dr. Von Fischer began the evening with a brief outline of the history and growth of the industry, later advocating increased educational programs on plastics in universities.

Preceding the discussion period, talks were given on vinyls, polyethylene, and fluorocarbons, by W. J. Connelly, Bakelite Co.; on thermosetting plastics, by Maurice Bigelow, Barrett Division, Allied Chemical & Dye Corp.; and on reinforced polyesters, by H. L. Gerhart, Pittsburgh Plate Glass.

Panel on User's Opinion of Plastics

The joint meeting of the SPE Chicago Section and SPI Midwest Chapter, held in Chicago, Ill., at the Western Society of Engineers Building on April 21, was treated to a panel discussion on "What the End-User Thinks of Plastics." Members of the panel who advised the audience of some 120 persons on this subject were William Cheely, purchasing engineer for Zenith Radio Corp.; Frank Low, senior development engineer for Hotpoint, Inc.; and Herbert Zeller, director of styling for Motorola Corp.

The usual cocktail party and dinner preceded the technical session.

La Grange Discusses Foamed Plastics

The April 27 meeting of the St. Louis Section, SPE, heard a very interesting talk on foamed plastics from Lester La Grange, Monsanto Chemical Co. Mr. La Grange presented a brief history of the materials and described various methods of application and the quantity of foamed plastic required in each.

The methods used for making various foams were also discussed by the speaker, who demonstrated the manufacture of a flexible type of Monsanto's isocyanate polyester foam. The special properties and degrees of variation of this isocyanate plastic were described to the gathering.

Vinyl Film Retail Handbook from SPI

A SIX-page brochure outlining the benefits of participation in the vinyl film standard of quality promotional program is currently being mailed to leading mail order firms, indepentent retailers, limited price variety chains, and resident buying offices, as well as some 1,000 manufacturers of finished vinyl products. Object of the mailing is to give the details about the program being conducted by the Vinyl Standards Educational Committee, The Society of the Plastics Industry, Inc., 67 W. 44th St., New York 36, N. Y.

Theme of the booklet is based on action which can be taken by retailers to help them sell more vinyl film by meeting consumer demands for end-products made of vinyl film which meets the rigid specifications of the new industry standard, C. S. 192-53, as accepted by the United States Department of Commerce.

Unicellular Formulations for Foamed Vinyl Developed

A NUMBER of polyvinyl chloride formulations in which a gas-liberating chemical is dispersed throughout a plastisol have been developed by Foam King, Inc., New York, N. Y., for use in manufacturing unicellular foamed products with open or closed cells without the application of high pressures or temperatures. Patents on the developments, most important phase of which is the method of compounding the formulations, are being sought by the firm.

Upon receipt of such patents, licenses will probably be granted to interested companies, including many of the larger rubber concerns or their subsidiaries.

The reported advantages of the Foam King formulations are that, in addition to eliminating the need of pressure tanks and pressure molds, a single celled material with uniform density throughout can be manufactured. Relying on a "strictly chemical approach," the blowing agent, a solid material, is, in effect, dispersed through the material. Upon heating, the solid evolves a gas to expand the plastisol.

(Continued on page 396)

Scientific and Technical Activities

Tlargi Panel Discussion on Compounding and Processing Problems

A "PANEL discussion on Compounding and Processing Problems" highlighted the April 6 meeting of the Los Angeles Rubber Group, Inc., held at the Hotel Statler, Los Angeles, Calif. The panel of questions and answers (see below) took place during the afternoon technical session attended by 78 members and guests. C. R. Bigelow, Darnell Corp., Ltd., was moderator of the discussion, and the panel members were C. E. Wilson, Pacific Molded Products Co.; Floyd Price, W. J. Voit Rubber Corp.; A. F. Reznicek, Rubber Products Engineering Co.; and Douglas Chalmers, Golden State Rubber & Latex Corp.

A cocktail hour and dinner followed the technical session. The after-dinner speaker was Bill Veeck, baseball enthusiast, who gave an informative and humorous talk on his experiences as owner of the Cleveland Indians and St. Louis Browns baseball clubs. The meeting concluded with the distribution of prizes to the following winners: R. D. Abbott, R. D. Abbott Co.; D. L. McGinnis, Naugatuck Chemical Division, United States Rubber Co.; C. R. Nordin, P. B. Division of Byron Jackson Co.; F. T. Shor, Fargo Rubber Corp.; J. J. Stetina, Triangle Tool & Machine Works; Harry Trechter, Harwick Standard Chemical Co.; William Welch, Midwest Rubber Reclaiming Co.; and Dick White, Caram Mfg. Co.

Questions and Answers

Q. What primer should be used on nylon fabrics for coatings of nitrile rubber when the coated fabrics are plied-up for use as heavy-duty, high-pressure diaphragm reinforcements?

A. Chalmers. Either latex or solvent based coatings can be used. A latex-base formulation can be as follows:

	Dry Weight
Paracril[1] or Hycar[2] Latex (medium acrylonitrile content, 40-50% solids)	100.00
Resorcinol	25.00
Formaldehyde	4.63
Sodium hydroxide	1.25
Aquablak[3] or equivalent	5.00
Water to 20% solids	

The fabric is painted with or immersed into the latex formulation until it has picked up 10-15% solids. Du Pont's BAC Latex[4] (40% solids) can be used as the polymer in this formulation. General Tire & Rubber Co.'s Gentac Latex[5] in resorcinol-formaldehyde solution is also suitable.

A cement-base formulation suitable for the application would consist of 100 grams of good-quality Hycar or Paracril friction stock (with a minimum of fatty acid or ester plasticizers content), 600 grams of toluene and five grams of MDI-50[4] to each 100 grams of rubber-toluene mixture. The fabric is painted with or immersed into the solution to obtain 10-15% pick-up.

Q. How do you make electrically conductive rubber from natural or neoprene latex?

A. Wilson. The procedure is to ball-mill acetylene black with a dispersing agent so as to make 50 parts of black on the neoprene content of the latex. Too much ball milling can lower the conductivity of the mix, much the same as too much mixing can lower the conductivity of dry rubber. Use the material as soon as possible, since aging seems to cause a loss of conductivity.

Q. When Banbury-mixing heavily loaded neoprene "hot" stocks, can the mixing temperature be held down by the addition of small amounts of water? If so, how much water?

A. Chalmers. Yes. Quantities of water vary according to stock and formulation. A rule of thumb for very hot mill batches is that 2-2.5% of water in the batch produces enough flash heat with so little residual water in final batch that testing for effects shows no results one way or the other. The limiting factor is more the rate of addition so as not to impair incorporation of dry pigments. The water should be added only at elevated temperatures and in small increments.

Q. Explain the relative merits of showing compounds on 100 parts rubber hydrocarbon basis *versus* on a percentage basis.

A. Reznicek. The merits of each method depend on the point of view. Rubber chemists and compounders generally consider the various ingredients in rubber compounds on the basis of the rubber present irrespective of whether they eventually show such compounds on one basis or the other for factory and management reference or even their own records. This is particularly important to them with compounds carrying high loadings of inert pigments because in such compounds the rubber present may actually be as little as 25% of the total compound, and it is more difficult to judge the probable effect of each active ingredient on the rubber unless that realtionship is converted to the basis of 100 parts rubber hydrocarbon.

There is also the matter of convenience for compounders to use the 100 RHC basis in experimenting with variations in formulations with less mathematical computation in the course of compound development.

Considering the other operations in a rubber product factory, there probably is no sound justification for other than the universal standard percentage basis. For the most part it is preferable to convert to that basis for purposes of material control, purchasing, scheduling, and cost accounting.

Somewhat apart from this question, it is our opinion that every plant in the rubber industry would be better off converting all weights and scales to pounds and decimal parts thereof rather than pounds and ounces.

Q. How do you accomplish peroxide cures in natural rubber stocks?

A. Price. Peroxide cures can be accomplished by adding between 5-10 parts of benzoyl peroxide to the rubber. Ostromislensky found that peroxide would vulcanize rubber without any sulfur present. The resulting product had good physicals, but very poor aging characteristics. The vulcanization is actually a process of oxidation of the rubber. During vulcanization, 60% of benzoyl peroxide is converted to benzoic acid, which appears as a white bloom on the surface of the rubber.

Fisher has produced a hard rubber, using 20-30 parts benzoyl peroxide. The materials were put together in a solution and, after evaporation of the solvent, the rubber was vulcanized.

Most of the work on peroxide cures has been done in connection with theoretical approaches to rubber vulcanization. The addition of sulfur in a peroxide vulcanizate will improve the age resistance. A compound containing 100 parts natural rubber, 10 parts peroxide, and 10 parts sulfur gives vulcanizate properties of 3,000-psi. tensile, 905% elongation, and high resiliency and softness. High physicals of this nature are difficult to obtain with loaded sulfur vulcanizates.

Q. What loading fillers, other than silica or calcium silicate, can be used in green natural rubber so that, when buffed, the buffed area appears green and not white?

A. Wilson. Green natural rubber stocks loaded with 125 parts clay, 20 parts calcium silicate, or 20 parts lithopone do not show a whitening effect when buffed. Check the coloring agent and possible use of some surface conditioners, as the types of fillers do not appear to have any effect on the change of appearance. It might well be that buffing the gloss from the molded part has given a different refraction of light, causing the buffed area to look white.

Q. With a natural rubber stock containing 68 parts Silene EF,[6] 3 parts sulfur, 5 parts oil, 5 parts zinc oxide, 3 parts stearic acid, how do you accelerate this stock so that it cures up tight in the mold, yet is not scorchy?

A. Price. I would suggest that one part of a thiazole accelerator, plus approximately 0.25-part TMTDS be used to obtain the necessary tight cure. The best thiazole accelerator I would recommend would be MBTS. With these accelerators, I would add between 0.10-0.20-part of a retarder based on the Mooney scorch results. With more than 0.20-part retarder, there is little added effect except possibly a reduction in physicals.

Q. How do you compound with cold rubber (LTP GR-S)?

A. Reznicek. The request being so broad, we shall make some general observations.

The usual starting point is replacement of the hot GR-S in a formula with the corresponding LTP GR-S insofar as possible. The course to take after this step is evaluated depends on the end-product and the characteristics desired in processing.

The first general experience with LTP GR-S was with rosin soap emulsified cold polymers; whereas most hot GR-S experience was with fatty acid emulsified polymers. This fact misled many compounders to believe that cold GR-S was slower curing. The introduction of improved oil HAF blacks especially advantageous for cold GR-S compounds induced faster curing; so some compounders

[1] Naugatuck Chemical, Division United States Rubber Co., Naugatuck, Conn.
[2] B. F. Goodrich Chemical Co., Rose Bldg., Cleveland, O.
[3] Binney & Smith Co., 380 Madison Ave., New York, N. Y.
[4] E. I. du Pont de Nemours & Co., Inc., Rubber Chemicals Division, Wilmington, Del.
[5] General Tire & Rubber Co., Chemical Division, Akron, O.
[6] Columbia-Southern Chemical Corp., Pittsburgh 22, Pa.

might have concluded that cold GR-S is faster curing.

Another effect of the rosin soap *vs.* fatty acid soap emulsified polymers was to increase cohesiveness and inherent tack of the cold GR-S polymers. This resulted in processing differences which can be turned more often to advantage than detriment.

It is probably generally known that if hot GR-S is replaced with cold GR-S in a given formulation, one can expect: better standard physicals of the cured compound; greater cohesiveness, tear resistance, and flexibility of the uncured and cured stocks; greater tackiness and better film forming characteristics; faster mixing; and, with some compound modification, generally faster and better processing, often at lower compound and processing costs.

Q. Is product quality of mechanical goods improved by transfer or injection molding *vs.* compression molding?

A. Wilson. It is not possible to make a general statement since each product or item must be studied to arrive at the proper method of molding. If fine tolerances are demanded or intricacies of parts are critical, transfer molding is indicated. However, all parts are not adapted to the transfer method of molding. One also has to consider the trimming problem when deciding on the method of molding. Quite frequently, it is more costly to operate a transfer mold than a compression mold, but the savings in trimming costs will offset the increased press cost. Injection molding for rubber is too new to discuss, although it does show real possibilities.

Q. Is there an advantage to varying Banbury rotor speed for different compounds?

A. Reznicek. There definitely is, but any studies of this nature should take into consideration power input and the fact that heat generation is much greater at the higher speeds, so must be dissipated.

Q. Is preheating of rubber before molding of any advantage?

A. Price. Preheating of rubber before molding is particularly advantageous in the molding of thick sections. Dielectric preheating is especially adaptable. Preheating of rubber reduces the final curing cycle, giving a more uniform molded rubber product. Disadvantages include possible scorching of the stock, and the reduction in viscosity of the rubber stock, thereby increasing the chances of air trapping.

Bugbee Puts Rubber Use at 3,350,000 Tons by 1962

"WORLD consumption and production of new rubber in the year 1962 will approximate 3,350,000 tons," and of this total more than 65%, or 2,200,000 tons, are expected to be the natural material. This belief was expressed by H. C. Bugbee, president of the Natural Rubber Bureau, in an address before the thirteenth annual international meeting of the Buffalo Rubber Group and Ontario Rubber Section C.I.C., at Niagara Falls, Ont., Canada, May 14.

(Similar predictions advanced by H. F. Palmer, U. S. Rubber Reclaiming Co., Inc., in a recent address before the Chicago Rubber Group, are reported elsewhere in this section.)

This estimated 1962 total consumption is a 40% increase over the 2,380,000-ton figure for 1953, an increase that the speaker considered pessimistic since the average increase for the 40-year period from 1910-50 is 100% per decade. Broken down, natural rubber should get 30% more business in 1962 than it did last year with 1,700,000 tons, and synthetic consumption will be 53% more than it was in 1953, when 750,000 tons were consumed.

The current oversupply of rubbers, now absorbed by government stockpiling, will end in 1955 or 1956, Mr. Bugbee contends. Consumption, meanwhile, will rise as a result of increased car and truck registrations to take up the excess.

In the natural rubber market, production will increase markedly because of the high-yielding trees now planted or being planted in southeast Asia plantations. Some 34% of planted area on estates at the end of 1952 was of this variety of tree; and the Government of Malaya is currently subsidizing planting of these high-yielding trees on private, smallholder land. In view of the difference in yield from ordinary rubber trees and this newer variety, given as 355 pounds per acre and 800 pounds per acre, respectively, more than twice as much natural material from that area should be soon available. It is even conceivable that the 2.2 million-ton figure could be achieved with present trees since the best year output of each country adds up to only slightly less than this amount, he said.

On the competition between natural and synthetic rubber, Mr. Bugbee considered that the trend toward natural rubber, due to lower price since last September, will continue. He estimates that this year will be a 48-52 split between natural and synthetic, and with the prospective sale of government synthetic facilities to private industry, the price of the synthetic material (now 23¢ a pound) should rise appreciably (to 24-27¢, he believes) to further the trend toward the natural product.

Other factors such as research and development work on the growth and preparation of natural rubber, its presentation to the market (Technically Classified Rubber), and new applications should also contribute to increased consumption of natural rubber, he concluded.

Bolton Receives Chicago Section, A. C. S., Gibbs Medal

ELMER K. BOLTON, for 21 years director of the E. I. du Pont de Nemours & Co.'s chemical department, received the 1954 Willard Gibbs Medal of the American Chemical Society's Chicago Section on May 21.

The medal, one of the highest honors in American chemistry, is awarded annually to an outstanding chemist selected by a national jury. It was presented to Dr. Bolton at a meeting at the Furniture Club of America, in Chicago, Ill., by Harry L. Fisher, professor at the University of Southern California and president of the Society.

Roger Adams, of the University of Illinois, spoke on "The Medalist," and Marvin C. Rogers, R. R. Donnelley & Sons, and chairman of the Chicago Section, gave a brief history of the Willard Gibbs Award.

In his acceptance address Dr. Bolton emphasized that America must look to its universities rather than to industry for the bulk of the basic scientific research on which the national welfare and security depend.

Defining basic or fundamental research as original exploration for the advancement of scientific knowledge without regard to specific commercial objectives, he urged industry, particularly in the chemical field, to place more emphasis on this type of research. The medalist added, however:

"Industry can never hope to do more than a small fraction of the basic research so indispensable to the country's progress."

The development of the chemical industry has been made possible by the competent research men trained in the universities, according to Dr. Bolton, who continued:

"New processes and products stem from the principles and concepts uncovered in fundamental research wherever the fundamental research may have been carried out, but the big share of the responsibility for developing new scientific knowledge rests upon the universities.

"When the universities have accepted from the government problems relating to national defense, their contributions to new fundamental knowledge have suffered, and the need of industry to increase its amount of fundamental research is accentuated."

The fundamental research by du Pont which led to the development of nylon and neoprene synthetic rubber was reviewed, and the Medalist said in conclusion:

"It is well recognized in chemical industry that competition in research is becoming more intense every year. There are now many large industrial laboratories constructed since World War II which have been equipped with excellent facilities and staffed with very capable research men. It would be wise for a company not to depend solely on the advances in chemistry and chemical engineering resulting from academic research, but to acquire new knowledge in its own laboratories."

Rubber Division N. Y. Meeting Paper Deadline June 29

THE secretary of the Division of Rubber Chemistry of the American Chemical Society, A. M. Neal, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., in a letter to members of the Division under the date of May 14, reminded them of the meeting to be held in New York, N. Y., September 15 through 17, at the Hotel Commodore. This meeting is being held with the parent Society, and the local chairman in charge of arrangements for the Division meeting is J. F. Breckley, Titanium Pigments Corp.

It is necessary for abstracts of papers to be presented at this meeting to reach the Division secretary by June 29. Abstracts should be about 200 words in length, submitted in triplicate, and should be accompanied by a letter telling the laboratory in which the work was done, who will deliver the paper, and how much time is requested. One of the authors must be a member of the A. C. S. Four copies of the paper are to be handed to the secretary at the meeting.

The first technical session of this meeting is scheduled for the afternoon of September 15, with J. C. Walton, Boston Woven Hose & Rubber Co., Division chairman, presiding.

Sparks Receives A.I.C. 1954 Gold Medal

W. J. Sparks, Right, Accepts 1954 Gold Medal Award of the A.I.C. from Gustav Egloff, in Ceremony at Asbury Park, May 14

THE 1954 Gold Medal of the American Institute of Chemists was awarded to William J. Sparks, co-inventor of Butyl rubber and director of Standard Oil Development Co.'s chemical division and coordinator of exploratory research, at the Gold Medal Dinner of the Institute at the Berkeley Carteret Hotel, Asbury Park, N. J., on May 14. This dinner concluded the thirty-first annual meeting of the Institute, which had begun on May 12.

Lincoln T. Work, consultant, retiring president of the Institute, presided at the dinner and introduced Carl S. Marvel, University of Illinois, and E. V. Murphee, Standard Oil Development Co., who spoke for the medalist. Gustav Egloff, Universal Oil Products Co., chairman of the Institute's medal award committee, made the presentation, in which he described Dr. Sparks as, "An eminent chemist who has striven unceasingly for promotion of the science of chemistry and the professional advancement of the chemist."

Dr. Marvel mentioned some incidents in connection with Dr. Sparks' student days at the University of Illinois and described the medalist as an "experimentalist rather than a theorist," and one who had always been unselfish with his talents for the benefit of all.

Dr. Murphee explained first the pride his company felt in the achievements of Dr. Sparks, including his development with R. M. Thomas, also of Standard Oil Development, of Butyl rubber. In addition, the medalist has more than 100 patents to his credit, certain others of which were taking on new importance in the field of resins and high polymers. Dr. Murphee also paid tribute to Dr. Sparks' very considerable efforts in many other professional and scientific societies.

Accepting the award, Dr. Sparks made a plea for international cooperation among friendly nations in the science of chemistry. He said that within the past 30 years the United States has assumed world leadership in chemical thought and accomplishment.

"Having attained that leadership," he added, "we must face the responsibilities that go with it."

Significant developments in international chemical activities which have resulted in present-day synthetic rubbers, resins, and fibers were reviewed, and it was pointed out that the basis for many of these developments originated outside the United States. He emphasized that cooperation in basic science must come from contributions of individual scientists.

Dr. Sparks is chairman of the National Research Council's Division of Chemistry and Chemical Technology and in 1953 was head of the U. S. delegations to the International Union of Pure and Applied Chemistry held in Stockholm, Sweden.

New A.I.C. Officers

At its annual business meeting on May 13, the Institute elected the following new officers and councilors: president (two-year term), Donald B. Keyes, Arthur D. Little Co.; president-elect, Ray P. Dinsmore, Goodyear Tire & Rubber Co.; secretary (two-year term), Lloyd Van Doren, Watson, Leavenworth, Kelton & Taggart; treasurer (two-year term), Frederick A. Hessel, General Aniline & Film Corp.; councilors (three-year terms): Emil Ott, Hercules Powder Co.; Dr. Sparks; and John R. Bowman, Mellon Institute.

A.I.C. Editor Honored

Miss Vera F. Kimball, editor of the Institute's publication, *The Chemist*, was presented with a framed life-membership certificate by Dr. Work at the close of the business meeting, for 25 years' service with the national office of the Institute.

Miss Kimball is serving her twentieth year as editor and received letters of recognition of her service from all past presidents of the Institute and editors with whom she has worked.

Car Tires Discussed at Washington

THE contention that the modern passenger-car tire has become "An Ever-Increasing Refinement of Compromises" was considered by R. D. Evans, Goodyear Tire & Rubber Co., in an address on April 21 before some 60 members and guests of the Washington Rubber Group. The meeting was held in the auditorium of the Potomac Electric Power Co. Building, Washington, D. C.

Tracing the development of passenger-car tires from before Pearl Harbor, the speaker described the requirements for tires at that time and compared them to present ones. The current demands for high-speed tires has resulted in stronger tire cord requirements, and the present trend toward smoother roads is resulting in the construction of tires with higher-pressure capacities. This latter factor is a reversal of previous trends toward low-pressure units, according to Mr. Evans, and has been accompanied by a number of features which customers now expect to be incorporated into the product they buy. The speaker listed six of these requirements as: (1) long service life, (2) soft and quiet ride, (3) fast stopping ability, (4) good steering ability, (5) integrity of construction for high speed, (6) low tire drag; and pointed out that they are not all mutually compatible within one tire. Thus the compromises between the incompatibles that must be effected are constantly being refined by the tire manufacturers to approach more closely customer ideals.

Mr. Evans concluded his paper with an optimistic prediction of future tire developments in the fields of cord fibers (to be stronger than nylon) and polymer-chemical combinations (to provide lower hysteresis and greater heat resistance).

Other events of the evening included a presentation of candidates for election as officers of the Washington group, at the May meeting.

Rubber-Plastic Blends Discussed at Connecticut

A SURVEY of the field of "Blends of Rubber and Plastics" was presented to some 130 members of the Connecticut Rubber Group at the spring meeting in West Haven on May 13 by Roger Bascom of B. F. Goodrich Chemical Co. Another event of the evening was the presentation of the men nominated for offices within the Group for 1955.

Mr. Bascom, after dealing briefly with the initial investigations into this field during the 1920's, cited the use of high-styrene resins in rubber as having provided a great boon to the industry in general and to the shoe soling industry in particular. He mentioned that such blends as phenolic resins with nitrile rubber, polyvinyl chloride resins with nitrile rubber, and polyvinyl chloride latex with nitrile latex have shown promise of becoming economically feasible materials.

1963 World Consumption Placed at 3.3 Million Tons

RUBBER consumption in the world by 1963 will reach 3.3 million tons, 2.1 million of which will be natural rubber, according to a prediction voiced by H. F. Palmer, vice president of U. S. Rubber Reclaiming Co., Inc., at the April 30 meeting of the Chicago Rubber Group, attended by 125 persons, at the Furniture Mart, Chicago, Ill.

(Similar estimates by the president of the Natural Rubber Bureau are reported elsewhere in this section.)

Dr. Palmer indicated that today's situation of an oversupply of natural and synthetic rubbers will reverse itself over the next decade when stockpiling will end and when private owners of synthetic rubber facilities will rely on "price mechanism rather than production control as a means of maintaining equilibrium between rubber supply and demand." Such demand, barring depression or war, will require the construction of additional synthetic rubber facilities if the 1.2 million-ton mark is to be achieved. Current capacity in this respect, plus that expected from installations now planned, will be inadequate between 1956-59, he said.

The price of the standard GR-S type of polymer will be 23-25¢ a pound, he estimated, if the plants are bought from the government for 70% of their current cost, paid off over four to five years, operated by the private owners at 80% of capacity, and supplied with butadiene costing 15-16¢ a pound and styrene costing 18¢ a pound. It is even conceivable that, under strongly competitive conditions, the price will be as low as 21¢ a pound, the speaker, Dr. Palmer, concluded.

Chicago Group members elected a slate of officers and a board of directors for the 1954-1955 period and adopted the proposed revision of the constitution and by-laws of the Group. Those officers elected were: president A. L. Robinson, Hardwick Standard Chemical Co.; vice president, L. W. Heide, Western Felt Works; secretary, A. E. Laurence, Phillips Chemical Co.; and treasurer, V. J. La Brecque, Victor Mfg. & Gasket Co. To the board of directors in the supplier category were elected J. E. Dunne, C. P. Hall Co.; S. F. Choate, Tumpeer Chemical Co.; W. A. Cary, Cary Co.; and J. E. Meyer, Herron & Meyer of Chicago. The manufacturing members of the board include B. Vandermar, Western Felt; J. Gallagher, Allis Rubber Co.; H. Stark, Dryden Rubber Division; and J. Braden, Industrial Rubber Goods Co.

Chemigum SL at Philadelphia

SOME 125 members and guests of the Philadelphia Rubber Group heard an address by N. V. Seeger, Goodyear Tire & Rubber Co., on the company's new polyester rubber, Chemigun SL. The meeting was held on April 30 at the Poor Richard Club, Philadelphia, Pa., and included a dinner and cocktail hour.

Dr. Seeger's talk was very similar to the address given before the New York Rubber Group on April 2 by R. P. Dinsmore, of Goodyear, a report on which was carried in our May issue, page 236.

The next meeting of the Group, the annual outing, was announced as scheduled for August 20 at the Cedarbrook Country Club, Mount Airy, Philadelphia 19.

Northeastern Section, Elastomer & Plastics Group, A. C. S., Program on Butyl Rubber

THE Elastomer & Plastics Group of the Northeastern Section, A. C. S., held a meeting on April 20, at Massachusetts Institute of Technology, Cambridge, Mass., at which Robert L. Zapp, Esso Research Laboratories, spoke on "Butyl Rubber." A total of 60 members and guests attended.

Dr. Zapp reviewed briefly the history of olefin polymer developments which resulted finally in increasing the molecular weight and properties of the polymers.

The low temperatures used and the rapidity of the reaction are the main features of the present-day Butyl polymerization process.[1] The speaker gave statistics concerning the production of the raw materials used, i.e., isobutylene, isoprene, ethylene, and methyl chloride. Control of the polymerization process is exercised mainly by setting the amount of conversion desired and by specifying the reactants' purity.

Dr. Zapp mentioned the halide and other-type catalysts used in this ionic polymerization process, pointing out the contribution of solvents to this phase of the process. He showed how it had been proved that the 1-1½% of isoprene entering into polymer formation was present as a 1,4 addition reaction; he also explained the influence of molecular weight on the plasticity and recovery of Butyl polymer, and that of unsaturation on the ozone resistance of vulcanized compounds.

A discussion of the compounding of Butyl followed, with emphasis on curing systems, and the hot-mix or heat-treatment technique, as applied to carbon black stocks, and the effect of the latter on tread wear of tires. Although Butyl treads now have a better than 100% wear rating (120% in recent California tests), the carcass life is still not satisfactory owing to poor fabric adhesion—a problem now under study.

Maximum service temperatures for Butyl products were discussed, and it was added that the problem of bonding Butyl and rubber was being attacked by adding reactive groups to Butyl after polymerization, for the improvement of adhesion.

[1] India RUBBER WORLD, May, 1954, p. 203.

TLARGI Lab Gets Banbury Mixer

THE Rubber Technology Laboratory at the University of Southern California, sponsored by The Los Angeles Rubber Group, Inc., received in March a size B laboratory model Banbury mixer from Farrel-Birmingham Co., Inc., Ansonia, Conn. The Group not only got the Banbury, but also saw F. H. Banbury, inventor of the unit and consultant to Farrel, put the mixer into operation.

The Laboratory now houses, in addition to the Banbury, a 13-inch laboratory open mill, a four-roll laboratory calender (also produced by Farrel), an Atlas Weather-Ometer, two Preco presses, and numerous pieces of testing equipment. To date, some $65,000 has been spent on the Laboratory, which is housed in two buildings, the testing section in the University's chemical engineering building, and the heavier compounding equipment in a separate one-story structure devoted entirely to that purpose.

Five accredited courses and one non-credit course are now offered by the TLARGI Rubber Foundation at U.S.C. Under the direction of the Foundation's head, Harry L. Fisher, president of the American Chemical Society, these courses provide information of both a practical and technical nature to inexperienced students as well as to old hands in the rubber industry. The practical end of the study is accomplished, of course, in the Laboratory.

Photograph by A. R. Hromatka

R. E. Vivian, Dean of the School of Engineering, U.S.C.; C. M. Churchill, Kirkhill Rubber Co.; J. B. Larkin, Laboratory Instructor at Rubber Technology Laboratory, U.S.C.; H. L. Fisher, Director of TLARGI Rubber Foundation and Professor at U.S.C.; and R. D. Abbott, R. D. Abbott Co., before the Newly Installed TLARGI Rubber Technology Foundation Laboratory at the University of Southern California

NEWS of the MONTH

Washington Report and National News Summary

The Rubber Quality & Packing conference in Singapore ended in late April with the U. S. delegation rejecting the request for official recognition of Singapore Type Descriptions for crude natural rubber so that they might become a part of the United States Rubber Manufacturers Association Type Descriptions. Mimeographed copies of Singapore Type Descriptions will be distributed to U. S. manufacturers, and this-type rubber can be purchased under RMA contract, however. The Conference was considered to have been of value to all concerned, and a second meeting in New York in October is scheduled. New information on conformance of imports with RMA standards was provided by the U. S. delegation.

Sales of GR-S have turned upward again owing to manufacturers' low inventory position and the increased prices for natural rubber.

The final stockpile rotation plan of the General Services Administration, aimed at minimum cost and least possible effect on the market, has been announced.

A 1954 surplus of new rubber of only 16,000 long tons was estimated by the International Rubber Study Group at its meeting which was held in Ceylon in May.

Sales of the rubber industry in 1954 are not expected to decline more than 10% from those of 1953, according to R. P. Dinsmore, Goodyear vice president. Some of the industry's major problems in 1954 are reduced costs, more markets for rubber products, accelerated research, and a successful disposal plan for the government synthetic rubber plants.

U. S. production of synthetic resins, synthetic rubbers, and synthetic fibers is largely responsible for the current 10% annual growth rate of the chemical industry, J. D. Fennerbresque, vice president, Celanese Corp., reports.

Supply has temporarily caught up with demand on most petrochemicals, and price reductions by the late 1950's which will affect various plastics and resins, were predicted by R. E. Hulse, vice president, National Distillers Products Corp.

American Synthetic Rubber Corp., consisting of 29 firms in the rubber and chemical fields formed to bid for the purchase of a government synthetic plant, was organized in May. Thomas Robins, Jr., president, Hewitt-Robins, Inc., who took the lead in forming the corporation, is temporary chairman of the board.

Washington Report by Arthur J. Kraft

Singapore Rubber Quality Conference Helpful; New York Meeting in October

The Rubber Quality & Packing Conference held in Singapore, April 22 through 24, which brought together representatives of The Rubber Manufacturers Association, Inc., of the United States and the Rubber Trade Association of New York and the representatives of rubber producers and shippers of southeast Asia, as well as rubber goods manufacturers from Europe, provided an opportunity for free and open discussions leading to a better understanding of major quality problems for all concerned. A second meeting is now planned for New York in October, at which most of the producer-packer-shipper organizations will again be represented.

In an issue of its "Rubber Quality Bulletin," dated May 12, the RMA said that the delegation representing U. S. rubber goods manufacturers had successfully resisted rather extreme pressure for official recognition of the controversial Singapore Type Descriptions for crude natural rubber. The U. S. group agreed, however, to distribute mimeographed copies of the Singapore Type Descriptions issued by the Singapore Chamber of Commerce Rubber Association to all U. S. manufacturers.

The Singapore Types are traded in the world markets and can be purchased under the RMA contract by any consumer who could adapt those types to his end-product requirements.

U. S. Group Comments

In preparation for the meeting the U. S. delegation spent two days visiting all of the operating milling plants and most of the packing houses in Singapore. W. J. Sears, RMA vice president and chairman of the RMA crude rubber committee, described the conditions found as very bad and commented that "the real improvement must start there. Nearly all material for the seven Singapore Types is imported from Indonesia—wet slab in poor condition and poorly smoked, dirty sheets."

In his final statement to the Conference, Sears, chairman of the manufacturers' group, made these points in behalf of the U. S. delegation:

(1) Agreed that there was a good reason for Singapore types—poor raw material.

(2) Agreed that RMA types are not being produced in quantity *now*.

(3) Agreed to desirability of standards for this market rather than diverse private types.

(4) Obtained the understanding that U. S. manufacturers want Singapore types as supplementary and additional, not replacing RMA types

(5) Clarified the point that while Singapore wants its types described in the RMA "Green Book," the RMA contends the Singapore "Blue Book" of type descriptions is sufficient.

(6) Made the point that if Singapore types were not selling, but were accumulating in warehouses, the U. S. attitude might be different, but these types have a buyer for every pound.

(7) Referred to the RMA-RTA type sample committee report on overlapping, of January 27, 1953, pointing out the situation would be more confusing and would lead to more misunderstanding and more claims, if the Singapore types were made a part of the RMA types.

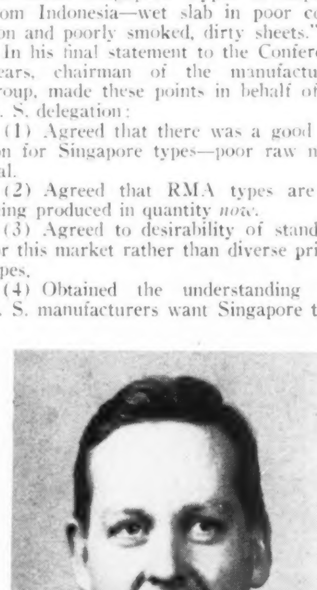
(8) Stated that the U. S. group would distribute the Singapore type descriptions explaining the conditions in Singapore; would advise manufacturers that they can purchase Singapore types on RMA contract, and that Singapore type samples may be bought; and would suggest to manufacturers that they consult their dealers as to availability of RMA and Singapore rubber and then make their own decision as to what to buy.

(9) Recommended that 30 RMA, plus seven Singapore types, be universal standards. Expressed the hope that acceptance of the RMA types will be the final objective.

(10) Congratulated the groups concerned for organizational work in Singapore and Malaya, particularly the Malayan Rubber Export Registration Board, and expressed the hope that other producing countries would do the same.

(11) Suggested continuation of this type liaison and cooperation.

(12) Raised for consideration the question: "What does the future hold in the way of quality improvement when they [natural rubber producers —EDITOR] face technical competition from private chemical rubber?"



W. J. Sears, Chairman of U. S. Delegation

Mr. Sears reported that the U. S. delegation considered the summary statement of the Conference chairman, C. F. Smith, who is also chairman of the MRERB, as a fair conclusion of the Conference.

Conference Chairman's Report

Mr. Smith expressed his gratification that the meeting was held in Singapore and said he felt the meeting had been of very great value to everyone. He then reviewed briefly nine points covered during the meeting.

MOISTURE IN BALES. The RTA of N. Y. showed a sample of Amber, evidencing the result of rubber having been packed wet. This matter is serious, and organizations concerned were asked to give it serious consideration.

ABRITRATION AWARDS. The RTA of N. Y. supplied full particulars as to the method adopted in New York when dealing with arbitration and will provide further information to the RTA of Singapore and other similar associations upon request.

TECHNICALLY CLASSIFIED RUBBER. The Rubber Research Institute of Malaya provided very interesting details of this type of rubber, and it was suggested that the idea be supported to the fullest extent in all countries concerned.

FAULTY BALE COATING AND RMA CONFORMANCE TESTS. There is, in principle, agreement on the acceptance of the new specification for bale coating now that the RMA has agreed to delete the solution test and agreed to refer the milling test to its technical people so that they can negotiate with the Rubber Research Institute of Malaya. The question of complete rejection of deliveries because of non-conformance was referred to the RTA of N. Y., the RTA of London, and the RTA of Singapore.

MARKING OF BALES. The new types of bale marking paints suggested by the RRI of Malaya and the Indonesian Rubber Research Institute were said to be of great value and help in dealing with shipments at point of shipping and at destination.

PROTECTION AGAINST RAINWATER DAMAGE. Steps being taken to deal with rainwater damage in Malaya by the MRERB and with assurance of cooperation from the shipping companies, and in Indonesia with regard to coastal steamers, should lead to improvement.

UNIFORM WEIGHT OF BALES. The desire expressed by consumer countries for bales of uniform weight is expected to receive favorable consideration by Singapore and Malayan associations.

MASSED, PRESSED, AND MISSHAPEN BALES. Complaints of receiving countries about misshapen and massed bales are also expected to receive attention.

SINGAPORE TYPE SAMPLES. The seven Singapore types are now traded in world markets and are to be considered supplementary to, but not in substitution of, the relative RMA types.

In conclusion, Mr. Smith expressed his appreciation for the remarks made by the RMA regarding the MRERB and added that steps were being taken in Ceylon to establish a similar Export Registration Board.

U. S. Report on Quality Analysis

In the RMA "Rubber Quality Bulletin" of April 23, excerpts from the report of the U. S. manufacturers' delegation at the Singapore Conference relative to conformance with RMA "Type Descriptions and Packing Specifications" were given. The data are based upon inspection reports of dealers and importing manufacturers, and Table 1 covers imports by the General Service Administration for 18 months in 1951 and 1952, together with private imports in the last half of 1952 and the year 1953.

On an annual basis the imports have shown a steadily increasing conformance to RMA standards. The seriousness of the complaints has steadily declined, and it is believed that further improvement can be made, the report said.

A comparison was also reported (Table 2) between the last six months of 1952 and the year 1953 for seven types of rubber, since these are the only two periods for which data are available covering private importation.

The above table, in addition to showing complete conformance to RMA standards, also shows the proportion of total imports that are no more than ¼ grade off standard. Since ¼-off-grade claims may be due to many reasons, and in recognizing the variety of individual judgment and decision involved in visual inspection, it is believed that the quantity of rubber that is within ¼ grade of standard shows an indication of the practicability of the standard. On this basis, the above table discloses that all types of rubber, with the exception of Thin Browns and Ambers, are at least 90% up to standard or no more than ¼ grade off. Of particular note is the marked improvement during 1953 of the Thin Brown Crepes. Conversely, the quality of Ambers has declined, the RMA report added.

The comparisons above apply to total imports from all countries of origin. For the last nine months of 1953, the grade imports were separately reported by country of origin. These data are in Table 3.

All countries do not supply all grades, and certain countries supply a much greater tonnage than others. Table 3 shows the rank of the various supplying countries in their conformance to RMA standards.

TABLE 3. CONFORMANCE TO RMA STANDARDS BY COUNTRY OF ORIGIN, LAST NINE MONTHS, 1953

Source	% U. S. Imports 9 Mos., 1953	Conformance to RMA Standards: Complete	Conformance to RMA Standards: Within ¼ Grade
Indonesia	49.9	5th	5th
Malaya	26.4	4th	4th
Thailand	17.2	6th	6th
Indo-China	4.4	2nd	1st
Ceylon	0.9	1st	2nd
Other	1.2	3rd	3rd

In conclusion, it was said that the U. S. trade and industry believe that these data demonstrate the practicability of RMA type samples, particularly after considering the substantial amount of claims that are made because of improper packing. The main difficulty continues to be with Thin Brown Crepes and Thick Blanket Crepes (Ambers), where 50 to 75% of quality claims for these grades were due to discoloration.

Disposal Commission Received 54 Bids

The Rubber Producing Facilities Disposal Commission in a report to Congress on June 1 announced that it had received bids from 33 companies for the government's 27 synthetic rubber plants; the number of bids was 54. In addition, 19 alternate bids were proposed.

Copies of the report were submitted to all members of the Senate Banking and the House Armed Services Committees, as well as to all Senators and Congressmen from areas where plants are located—in eight different states. The Commission gave no information on prices offered. It is believed that prices offered for the butadiene plants were generally more favorable than those offered for the copolymer plants.

The Commission has announced that it will negotiate first with the highest bidder for each facility. At the time bids were received the Commission had not yet decided on other negotiation procedures. It was believed it was looking favorably at the possibility of negotiating on a geographical basis, that is, groups of interrelated plants in the same locality.

TABLE 1. CONFORMANCE WITH RMA STANDARDS 1951-1953

		Percentage of Dry Natural Rubber U. S. Imports							
				Off Quality					Total Off
Period	Imports by	Proper Tender	Within ¼	Total	¼	½	1	2+	½ or More
Year 1951	GSA	58.4	75.4	41.6	17.0	13.6	8.9	2.1	24.6
1952	GSA & Pr.	65.4	83.6	34.5	18.2	12.7	3.3	0.3	16.3
Last ½, '52	Private	72.0	86.7	27.7	14.7	10.1	2.7	0.2	13.0
Year 1953	Private	69.9	88.3	30.1	18.4	9.8	1.8	0.1	11.7

TABLE 2. CONFORMANCE OF U. S. DRY NATURAL RUBBER IMPORTS TO RMA STANDARDS JULY 1, 1952—DECEMBER 31, 1953.

RMA Type	Complete Conformance		Within ¼ Grade		More Than ¼ Grade Off	
	Last 6 Mos., 1952	Year 1953	Last 6 Mos., 1952	Year 1953	Last 6 Mos., 1952	Year 1953
Ribbed Smoked Sheets	77.4%	73.5%	91.4%	91.0%	8.6%	9.0%
Pale Crepes	89.5	90.1	94.9	95.7	5.1	4.3
Estate Browns	86.5	86.8	90.8	93.7	9.2	6.3
Thin Browns	49.2	52.9	68.1	82.5	31.9	17.5
Ambers	41.5	31.7	67.6	63.1	32.4	36.9
Smoked Blanket*	81.2	67.7	89.7	98.8	10.3	1.2
Flat Bark	86.8	88.9	95.6	98.1	4.4	1.9
All types	72.0	69.9	86.7	88.3	13.3	11.7

*NOTE: Practically all Smoked Blanket imports were of a type other than described in the RMA Type descriptions; therefore these data do not reflect conformance to the RMA type.

RFC Rubber Sales Up

Synthetic rubber sales, which started to hit the skids nearly a year ago, are picking up. RFC's order books last month showed that demand for GR-S will reach 44,000 long tons in August, 22% higher than the newly revised estimate of July sales.

Back in April the agency had forecast June sales at 32,500 tons and July sales at 34,000. Last month's revised estimates boosted each of these figures by 2,000 tons. In all cases, the estimates are based on the firm, 90-day advanced orders required by RFC of the larger consumers of GR-S.

Reasons for Upturn

What's been the reason for the pickup? RFC offered the cautiously worded opinion that part of the answer rests in the fact that large users may have allowed their rubber inventories to dwindle too far below normal working levels.

Another part of the answer which may better account for why consumers apparently are seeking to replenish their factory stocks with synthetics lies in the price situation for natural rubber—the chief competitor of GR-S. Natural rubber has lost the price advantage it held over synthetic for the past year. Now there is little to choose between the two materials, following the recent price upturn for natural rubber.

Because they must file firm 90-day advance orders, consumers, in May, had to take a look ahead to what the summer might bring. The picture contained these elements: a war in Indo-China, the heart of southeast Asia's rubber growing region, with Communist military successes threatening to become a rout. That could exert upward pressure on crude rubber prices.

Another element was supplied by the International Rubber Study Group, which reported early in May that the natural rubber surpluses of the past few years now appear at an end. A statistical balance of supply and demand could be expected to sustain the current higher level of natural rubber prices. As for synthetic, the U. S. Government gave the firmest assurances at the IRSG meeting that the present price of GR-S will not be increased.

Production Steady

RFC will keep production of GR-S well below anticipated summer sales in order to trim further its heavy inventories. June output has been scheduled at 35,300 tons, July at 35,000, and August at 35,000. Government-held stocks on April 30 stood at 83,700 tons, a decrease of 5,600 tons during the month, but still uncomfortably close to the 85,000-ton ceiling at or below which RFC must close the fiscal year on June 30.

As of late May, no announcement had been issued form the White House transferring the synthetic rubber program to some other agency after June 30. RFC will go out of business on that date, but the rubber program will go on. Talk is that the new custodian of the program will be either the Treasury or Commerce department.

1953 Tariff Commission Figures

During 1953, production of synthetic rubber rose slightly, but sales declined, according to figures released recently by the U. S. Tariff Commission. Last year's output of 1,958 million pounds was 69 million higher than in 1952; while sales, totaling 1,909 million pounds in 1953, were down 94 million from those of the previous year.

GR-S output amounted to 1,415 million pounds in 1953 and 1,394 million the year before. Sales were 1,387 million pounds, valued at $319 million compared with the previous year's 1,514 million pounds, valued at $361 million. That's an 8.4% drop in quantity and 11.6% in value for GR-S sales.

Neoprene output amounted to 180 million pounds, and Butyl, 176 million. Other types of synthetics included in the overall total were silicones and vinyl elastomers.

GSA Announces New Stockpile Rotation Plan

The General Services Administration announced in May the long-awaited revision of its natural rubber stockpile rotation program. The new program, a revision of the interim "reform" procedures instituted last December, drew immediate praise from the group it was intended to please, the natural rubber producing countries.

The goal of the new program, GSA Administrator Mansure said, is "to maintain the national stockpile of crude natural rubber at the most economical cost and, at the same time, to accomplish the necessary rotation of our rubber stocks with the least possible effect on the rubber market." The new procedures, he added, will be kept under "continuous review to assure fulfillment of these objectives."

The New Plan

Chief features of the new procedures are:

1. A limitation of 5,000 tons a month on "upgrading" the stockpile, replacing lower grades with the higher grades required to produce the type of stockpile specified by the Defense Department.
2. Above this, GSA will be free to replace whatever quantities it desires in order to prevent deterioration of rubber in the stockpile. These transactions are likely to add another 5,000 tons to monthly rotation sales.
3. Forward selling by GSA will be restricted to the current or three succeeding calendar months, and delivery of replacement rubber must be made to the stockpile in the same month, but with this exception: in the case of deliveries of rotation rubber from the stockpile in the current month or the succeeding two months, an additional month will be allowed for replacement.

Unaltered is the requirement that purchase and sale of rotation rubber be made simultaneously at the identical level of the market. Also carried over from the previous program is the requirement that GSA sell to and buy from either a dealer or manufacturer. At the time of sale, the purchaser must decide whether to replace the rubber himself or have GSA make the replacement.

GSA Denies Affecting Market

The limitation on "upgrading" is designed to meet the objections, loudly voiced by natural rubber producers, and echoed by industry and trade here, that the uninhibited, fast-paced "upgrading" carried on by GSA prior to last December was depressing the market for lower grades of rubber. GSA had been releasing 10,000 tons or more of low-grade rubber, not required to meet the ultimate stockpile objectives, replacing it with equal tonnages of higher grades. Another objection was that GSA sold forward sometimes as much as a year in advance, a practice which led to the charge that GSA was using its considerable power in the market to influence prices in its favor.

GSA denied the charge of market manipulation and countered that the reason for its haste in ridding the stockpile of low, non-specification grades was a Defence Department directive ordering rapid attainment of the stockpile objectives. GSA was loaded down with low grades, obtained in the 18-month period following the outbreak of hostilities in Korea, when the agency served as exclusive buyer of all rubber imported into this country. The ultimate stockpile, as drawn up by the military, has room for only small quantities of low grades, but calls for vast quantities of superior, longer lasting grades. It was GSA's job, as manager of the stockpile, to acquire those higher "specification" grades.

An important effect of the new rotation procedures, with its strict monthly limit on "upgrading," will be to slow down the attainment of this goal. The goal itself of a high-grade stockpile hasn't been changed—at least no such change has been announced—but it will take longer to reach because of the stretchout in "upgrading."

The new procedures, in two respects, leave somewhat more leeway than did the interim, stop-gap measures instituted last December. The interim program limited all rotation sales—not just the upgrading transactions—to 5,000 tons a month. Under the new program, rotation sales are expected to run about 10,000 tons a month. GSA also was under a tighter restriction on forward selling.

IRSG Sees Small 1954 Surplus

The United States Government again has flatly turned down demands of natural rubber producers that it raise the price of synthetic rubber. The now recurrent demand was made by producer country delegates at the International Rubber Study Group annual conference, which met at Colombo, Ceylon, in early May.

To help palliate any damaged feelings, the U. S. delegate, Willis Armstrong, of the State Department, went along with a Study Group resolution directing the IRSG's management committee to maintain "close and continuous scrutiny" over the price relation between natural and synthetic rubber and to "draw the attention of member governments to any important change."

The Study Group estimated that world output of natural rubber this year will total 1,705,000 long tons, and that member nations (excluding the Soviet bloc) will produce some 706,000 tons of synthetics. The Group forecast world consumption of 1,681,000 tons (including the Soviet bloc) for natural and 714,000 tons (excluding the Soviet bloc) for synthetics. This leaves a surplus of only 16,000 tons of new rubber available for government and commercial stocks, surplus which, it is expected, will be readily absorbed.

In appealing for a boost in the government-fixed price of GR-S type of synthetic, the natural rubber producing countries told the U. S. delegate that "even at this late stage an increase in the price would be of material assistance in encouraging replanting (of natural rubber acreage) on a scale adequate" to place the natural rubber industry "on a more competitive footing (with synthetic) and to meet probable future world demand."

Mr. Armstrong agreed to convey these sentiments back to his government, but made it clear that he could not personally support the demand for a higher price for

synthetic because rising demand for rubber will permit the natural rubber industry to develop "satisfactorily without artificial or arbitrary increases in the price of GR-S." The U. S. Government, he said, had decided against boosting the price after it made a "careful examination . . . of its present pricing policy." Several agencies participated in this examination, our delegate also said.

Mr. Armstrong informed the conference, however, the U. S. Government is "prepared to give sympathetic consideration to specific proposals directed to increased effort on the part of producers to plant or replant with high-yielding strains, to reduce costs, and otherwise improve the efficiency of production and marketing" of natural rubber.

The Study Group, for the second straight year, failed to reach agreement on means of stabilizing the rubber market and on the necessity "for a buffer stock or any other international commodity agreement at this time." Stabilization of the rubber market, it insisted, however, remains a "prime objective" of both the rubber producing and consuming nations.

RMA Urges More Gulf Area Rubber Shipments

RMA went to bat last month for the increasing number of rubber factories located in the South. The occasion was a Federal Maritime Board hearing on the application of Lykes Bros. Steamship Co. to double the number of government-subsidized sailings between the Far East and United States ports that are on the Gulf of Mexico.

Lykes ships now make 24 trips a year with government-subsidy assistance between the Far East and the U. S. Gulf. It is seeking subsidy allowances for an additional 24 sailings it now makes without such aid.

Appearing on behalf of all RMA companies, Harry J. Carroll, Goodyear's traffic director, told the Maritime Board that the rubber industry is "very much interested" in additional service bringing crude rubber to the U. S. Gulf area.

Delivery to North Atlantic coast ports, such as New York, Mr. Carroll said, results in "needless" extra cost to plants in the South, because the rubber must be transshipped to the Midwest and then to the South. This practice also wastes time, which is "critical" because even a slight delay may make a difference of as much as 5¢ a pound in final cost accounting owing to the rapid fluctuations in the price of rubber, he said.

National News

Dinsmore Sees 1954 About 10% under 1953

Rubber industry sales in 1954 will depend much upon the showing made during the last half of the year, but might not decline more than 10% from 1953 figures, according to R. P. Dinsmore, vice president, Goodyear Tire & Rubber Co., speaking before a meeting of the Chemical Market Research Association at the Hotel Statler, New York, N. Y., on May 20.

The decline in the sale of new passenger cars and trucks in the first quarter of this year has reduced the consumption of new rubber used in tires by 17% compared to that of the same period last year.

The trend in the next few months in costs and profits is likely to be in the direction of net cost increases; hence there will be lower pretax margins. The speaker said next year the trend might be in the opposite direction.

If natural rubber yield and quality are improved, it will be a long time before synthetic rubber will replace natural rubber completely in the United States. The position of synthetic rubber in this country would be greatly improved, however, when and if the government gets out of the rubber business, but the problem of plant disposal and the necessary Congressional approval make the outlook uncertain, it was said.

Rubber-Chemical Activities

Dr. Dinsmore explained the several reasons why the rubber companies are increasingly active in the chemical field, as follows: (1) Rubber products manufacture is in itself a chemical business. (2) Because the rubber industry makes a large part of its special chemicals, it has developed familiarity with organic chemical synthesis. (3) The need of protecting its rubber supply led the industry into high polymer synthesis and has linked the rubber business with this important branch of synthetic chemical manufacture. (4) It is only normal for any industry to explore the areas where the products of other industries overlap and may therefore be expected to encroach progressively. The flexible plastics, such as vinyl, were stated to be in this category.

It was also pointed out that if the rubber industry takes over the major part of GR-S production as a private industry operation, this would represent an annual dollar increase of some $250 million.

Increased use of oil-extended hot GR-S for use in places where weathering resistance has been of chief importance might increase the total use of this-type rubber to 30 or 40% of the total GR-S.

In answering a question about the 100,000-mile tire, Dr. Dinsmore said such a tire would not be developed overnight, but that if it were, it would probably cut tire demand by 50 to 60%. He reminded his listeners that increases in tire life expectancy are offset by changes in automobiles and in operating conditions and the "life of the car" tire of today might not be adequate for the car of tomorrow.

The speaker further declared that the best indicator of the trend of rubber industry sales and earnings is price stability. If price stability is fairly good, earnings may not be much below those of last year. If prices become very unsettled, earnings could drop rapidly.

Rubber's 1954 Problems

The major problems for the rubber industry in the year ahead, according to Dr. Dinsmore, may be as follows: (1) reducing costs to offset the decrease in volume of business; (2) supplying better value by fitting products to needs and making the products more easily available, and giving better service; (3) making every effort to work out acceptable means for the purchase of the synthetic rubber plants from the government; (4) pursuing the development of new expanding applications for rubber; (5) giving better training and more opportunities to young men; (6) reexamining, improving, and accelerating the programs for research and development.

In conclusion, Dr. Dinsmore emphasized that his estimates and predictions were based on nothing more than an honest appraisal of facts as they now appear and might be wide of the mark by the end of the year.

Fennerbresque on Plastics and Fibers

Another speaker at the CMRA meeting, May 20, was J. D. Fennerbresque, vice president, Celanese Corp. of America, who reviewed present and future developments in plastics and synthetic fibers. He first pointed out that U. S. production of synthetic resins, synthetic rubbers, and synthetic fibers amounted to more than six billion pounds in 1953, and that these materials were largely responsible for the current 10% annual growth rate of the chemical industry.

Long-range prospects for polyester resins depend largely upon unproved resins and better fabricating techniques. Polyethylene is now showing the greatest growth potential of all plastics, it was added. Among the other plastics, the phenolics, the cellulosics, urea-formaldehyde resins, and the vinyls should continue to maintain their dominant position for several years.

Among the newer resins, growth of epoxies is steady and confined mainly to adhesives and electrical applications. Silicones are finding increasing use where heat and chemical resistance are important. Fluorocarbons are still used mainly in applications by the government. Polyamides are slowly increasing in use in molding and coating applications, but such uses are minor compared to the use of polyamides in textiles.

In connection with the proper place of synthetic fibers in the overall fiber picture, it was pointed out that present worldwide synthetic fiber production, including cellulosics, amounts to around 4½ billion pounds annually, compared to 25 billions of overall fiber production. Permanent markets for the newer synthetic fibers will have to come with the fibers eventually finding their rightful place in the market on the basis of serviceability and cost. This speaker said it was his firm belief that rayon and acetate will hold their place as the "bread and butter" synthetic fibers, and that the newer fibers, after their present surge, will taper off to a growth rate comparable to the rayons in conformance with their usefulness and cost.

Petrochemicals Market Slowing

In the current year, supply has caught up with demand on most petrochemicals, and there will be abnormally low returns on the investment for many petrochemical projects, according to R. E. Hulse, vice president, National Distillers Products Corp., another speaker at the Chemical Market Research Association meeting on May 20. National Petro-Chemicals Corp., with 60% ownership by National Distillers and 40% by Panhandle Eastern Pipe Line Co., recently started a new $50 million petrochemical plant in Tuscola, Ill. Successful petrochemical projects must be large scale and thoroughly integrated, Dr. Hulse stated.

No polyethylene is expected from new producers before April, 1955, and the total production by new producers in 1955 is expected to be between 50 and 75 million pounds. By 1956, however, new producers should be operating at high production rates, and a rather ample supply of polyethylene should be available to take care of the expanding market. A price level of about 31¢ a pound by 1958-1960 for polyethylene was predicted. In this connection, major reductions in price for polyvinyl chloride, cellophane, and many other plastic materials which will have to compete with polyethylene were also predicted by the late 1950's.

Dr. Hulse said he was not pessimistic regarding the future of petrochemicals, but that any slowdown would be temporary in nature. Within the next two or three years increased markets and new uses will take care of the present over-production on many materials which will help to stabilize the price level.

Robins Organizes American Synthetic Rubber Corp.

Thomas Robins, Jr., president of Hewitt-Robins, Inc., and also president of Kentucky Synthetic Rubber Corp., has taken the lead in organizing a new corporation, known as American Synthetic Rubber Corp., to bid for the purchase of one of the government owned synthetic rubber plants.

The new company, incorporated in Delaware with authorized capital of $6.6 million, is jointly owned by 29 firms engaged in the manufacture of rubber products and chemicals. Individual companies are subscribing amounts ranging from $5,000 to $2,000,000. Fifteen of the 19 firms comprising Kentucky Synthetic Rubber Corp. for the past four years are shareholders in the new coalition.

Robins said the new corporation "is unique in the rubber industry and possibly is the only one of its kind in America." He pointed out that several "joint venture" companies are in existence with as many as five members, but few, if any, with as many as 29. When American Synthetic Rubber Corp. was being organized, no applicant for membership was turned down.

All shareholders in the new company are rubber consumers except American Cyanamid Co., which is the largest single shareholder, with a subscription amounting to approximately one-third of the total capital.

Each consumer-stockholder will receive a basic allotment of approximately 500 tons of rubber per year for each $50,000 of investment. The allotments can be refused without penalty, however, if the rubber is not desired. American Cyanamid will market a portion of the output to customers outside the coalition through its technical service sales organization.

Thomas Robins, Jr.

The Board of Directors

The board of directors of the new corporation, consisting of 10 members, will be chosen from four major groups into which the 29 participating companies have been lumped in the interest of streamlined administration. Three groups which have subscribed the larger amounts of capital will be entitled to three directors each. The fourth group, with a proportionately smaller investment, will elect one director. Robins is acting as temporary chairman. Permanent officers will be elected after the acquisition of a plant.

The directors are Robert B. Fiske, B. W. Henderson, and S. C. Moody, of American Cyanamid; David W. Bernstein and Robert Marcus, of American Biltrite Rubber Co.; Raymond Mills, Endicott-Johnson Corp.; John H. Matthews, Raybestos-Manhattan, Inc.; Hugh S. Ferguson, Dewey & Almy Chemical Co.; Mr. Robins; and Everett Morss, Simplex Wire & Cable Co.

Shareholder Groups

The four groups of shareholders are as follows:

Group 1, (three directors), comprised of companies manufacturing a wide diversity of rubber products. Brown Rubber Co., Dewey & Almy, Donlop Tire & Rubber Corp., Faultless Rubber Co., Goodall Rubber Co., Hewitt-Robins, Raybestos-Manhattan, Seamless Rubber Co., Sponge Rubber Products Co., Thermoid Co., and the KYS Corp., which, in turn, is composed of Bata Shoe Co., Inc., Bristol Mfg. Co., Converse Rubber Co., Goodyear Footwear Corp., Goodyear Rubber Co., LaCrosse Rubber Mills Co., Servus Rubber Co., Tingley Reliance Rubber Co., and Tyer Rubber Co.

Group 2, (three directors), comprised of four companies for whom Charles J. Johnson, president of Endicott-Johnson, has acted as spokesman. American Biltrite, Endicott-Johnson, Johnson Rubber Co., and Wooster Rubber Co.

Group 3, (one director), comprised of five firms manufacturing wire and cable with rubber insulation, organized by Mr. Morss, president of Simplex. Anaconda Wire & Cable Co., General Cable Co., Phelps Dodge Cooper Products Corp., Rome Cable Corp., and Simplex.

Group 4, (three directors), American Cyanamid Co., chemical manufacturer and marketing agent for synthetic rubber sold to consumers outside American Synthetic Rubber Corp.

The Rubber Facilities Disposal Act passed by Congress in 1953 emphasizes the importance of providing a place in the synthetic rubber program for companies outside the large tire manufacturers. Mr. Robins expressed the view that American Synthetic Rubber Corp. provides an answer to this requirement. He added that the experience of the new group both in synthetic production and rubber fabrication should more than satisfy the government's requirement that purchasers have technical competence to operate a rubber producing facility. The combination of American Cyanamid's outstanding research facilities and background in petrochemicals research, with the group's plant operation know-how, gives reasonable assurance that American Synthetic, if it gets a plant, can contribute much to future development and improvement of synthetic rubber, he added.

RMA Cautions against Thin Retreads

The promotion among retreaders of the use of shallow skid-depth matrices was objected to by the RMA Tire Accessories and Repair Materials Committee in a release dated April 27. The operation would permit the use of $^{7}/_{32}$-inch gage camelback where ordinarily $^{12}/_{32}$- or $^{14}/_{32}$-inch material would be used.

The Committee said the practice is detrimental to public safety because the resulting tread thickness affords insufficient carcass protection against bruise breaks, cuts, or punctures. The difference in tread thickness is not readily discernible to the purchaser, and he would have no knowledge that he is acquiring a sub-standard product.

Since World War II, camelback manufacturers and retreaders have cooperated in assuring quality materials and workmanship, resulting in long-wearing products. Camelback manufacturers are concerned since, if retreaders turn out products with relatively short service life, public confidence in retreading would be lost as it was during wartime when retread mileage deteriorated for reasons peculiar to those times.

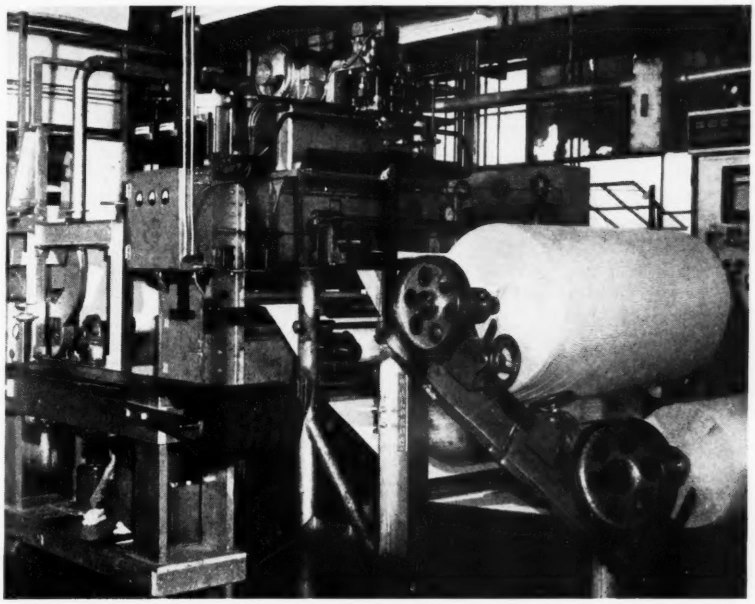
Manufacturers expressed confidence that reputable retreaders will shun the use of shallow skid-depth matrices, based on the experience that the best method of competing with new tires is to assure the customer long-wearing and safe retreads.

Enjay Erecting Laboratory

A structure to house the newly created Enjay Laboratories Division is being built on the grounds of the Standard Oil Development Co.'s research center at Linden, N. J. Some 11 laboratories and 14 offices will be contained in the 230- by 54-foot building when it is completed in November, according to the company.

The Division will supply sales technical service in the customer products field for Enjay Co., Inc., and the new structure will be equipped with equipment to permit study of the individual needs of the company's customers along such lines as petroleum solvents, additives, polymers, etc.

Other Industry News



Feeding Station of Goodyear's 3T Nylon Stretching Machine

Goodyear 3T Prestretching Process for Nylon Cord

After five years of research and an investment of $5 million, Goodyear Tire & Rubber Co., Akron, O., has developed an exclusive method of stretching nylon cord. In announcing the development, R. P. Dinsmore, vice president in charge of research and development, explained that the process has been designated 3T because a triple tempering procedure is involved.

The process has been incorporated into a machine that is claimed to be the largest and most advanced of its type in the tire industry. The machine stands four stories high and measures 150 feet in length; one unit has a capacity of 100,000 yards of nylon fabric per day and can accommodate at any one time one-third of a mile of fabric.

Three of these machines, representing an expenditure of some $4 million, have already been constructed for Goodyear by Ross-Waldron. Two are currently in operation, one in Akron, and the other in Cartersville, Ga. The third unit is being installed in the company's Rockmart, Ga., plant, and operation will begin in the near future.

Nylon, with its tendency to stretch under tension, performs best in tires after it has been stretched, since its capacity to cause growth and cracking of the tire is practically eliminated. In addition to these advantages, the company reports, the new process results in a cord that has higher tensile strength and increased resiliency as compared to untreated fabric.

Condition nylon has been tested in Goodyear's All-Nylon Super-Cushion tires to prove its superiority. One such test consisted of ramming a tire against a curb at 55 mph.; not one of the contained cords was broken, it was reported. Other tests are said to have demonstrated that the processed fabric has increased heat resistance and can provide a tire with increased mileage.

The process itself consists of chemically treating the nylon fabric and then subjecting it to high tension and temperature for a precise period of time. Its incorporation into the machine now in operation in Akron resulted in a unit which consumes untreated fabric at the seventh floor and discharges finished cord at the fourth floor. Both of the Georgia installations have required the construction of special buildings to house their respective machines; and all three of the machines now constructed have made necessary the fabrication of 120,000-gallon latex storage tanks.

To translate the process, whose chemistry and mechanics were worked out by a group under G. D. Mallory, from the research stage to practical production methods was the job of a team headed by P. W. Drew, manager of fabric development. Goodyear management entrusted the problem of designing the final production unit, the "factory in itself," to a group under the supervision of M. H. Kilgore, assistant manager of engineering. As a result of the efforts of these men, hundreds of yards of prestretched nylon fabric are being turned out every minute.

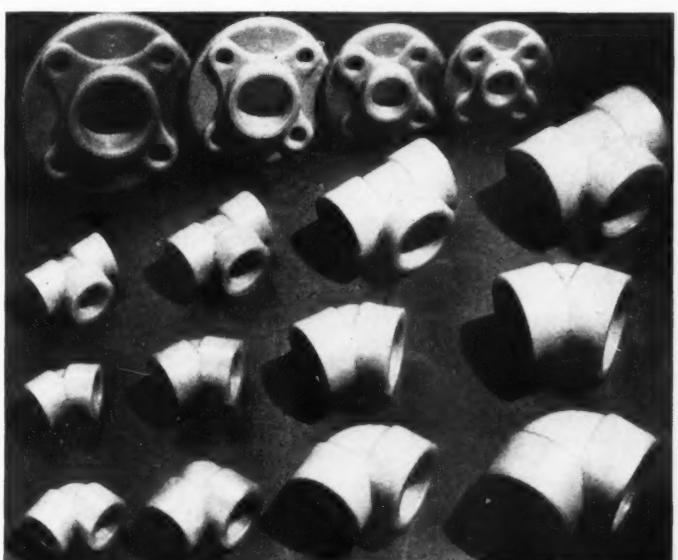
Naugatuck Sales Office Moves to Rockefeller Center

The New York sales office for the Naugatuck Chemical Division, United States Rubber Co., has been moved to the company's headquarters at 1230 Avenue of the Americas (Rockefeller Center), New York 20, N. Y. Previously located at 254 Fourth Ave., the office will continue to service the Metropolitan Area with the various molding powders, resins, and compounds produced by the division.

Injection Molding Unplasticized PVC Resin

The injection molding of Exon 402A, a rigid unplasticized polyvinyl chloride resin produced by Firestone Plastics Co., Pottstown, Pa., is now being successsfully accomplished for the first time, according to the company. Standard pipe fittings ranging in size from ½-4 inches threaded are being turned out at Firestone's plant at the rate of one per minute by means of a Jackson & Church Co. press which features the Hendry preplasticizing process.

This speed of production, after lengthy test runs and actual production runs, is reported to reduce the cost of the items to a marked degree. Tests have demonstrated the fine chemical and age resistant characteristics of the resin, the company states, and the perfect control of the fittings in respect to uniformity, threads, etc., that is attributed to the Hendry process results in a high-grade product.



Injection Molded Exon Rigid PVC Pipe Fittings

Naugatuck Celebrates Golden Anniversary

The fiftieth birthday of the Naugatuck Chemical Division, United States Rubber Co., was appropriately celebrated during Chemical Progress Week (May 16-22) with the prediction by John E. Caskey, general manager, that the $100 million gross of the organization will probably be increased by 25% by 1956. This outlook is made in view of the fact that the division is growing at a faster pace than at any time in its history, Mr. Caskey said at a press conference and luncheon at the Metropolitan Club, New York, on May 19, with new production facilities scheduled for completion in the near future and with the development of a number of new products soon to move from laboratories to production.

Since its inception in 1904 for the purpose of manufacturing sulfuric acid for use in rubber reclaiming operations, Naugatuck Chemical has branched out into a wide range of industries, including rubber chemicals, agricultural chemicals, latex, plastics, synthetic rubber, and TNT. Its current sales volume, which has increased 125% since 1946, 250% since 1940, and 500% since 1935, will certainly be supplemented when current expansion programs are completed.

Principal among these programs is an anticipated production of some 50 million pounds of nitrile rubber, plastics, and agricultural chemicals by the end of 1954 to bring the yearly production capacity of chemical products to 600 million pounds. Specifically, the division is doubling production of Marvinol vinyl resins at its Painsville, O., plant; tripling Kralastic molding powder manufacture in its Baton Rouge, La., facility; constructing additional units to the agricultural installation at Naugatuck, Conn.; and expanding the latex plant at Los Angeles, Calif.

In addition to these expansions, the organization is very active in developing new products, expecting to make public about 16 new developments this year. Included among this number, which is approximately one-third greater than the number developed last year, are new reclaim rubbers, latex compounds, and polyester resins, agricultural chemicals, and rubber chemicals.

An active interest in the forthcoming sale of government synthetic rubber installations, two of which are currently being operated by the firm, is still another direction for future expansion.

Possibly one of the best publicized of all of the developments of Naugatuck Chemical has been the pioneer work done in the field of applying reinforced plastics to automobile bodies. Since then, Vibrin polyester resin, laminated with fiber glass reinforcement, has steadily grown in use until today when, according to George R. Vila, assistant general manager, applications for the material which are known to be successful are limited only by the problem of adequate methods of fabrication.

Teflon Fiber Introduced at Materials Show

The second Basic Materials Exposition, held concurrently with the Basic Materials Conference in the International Amphitheater in Chicago, Ill., from May 17-20, had among its many features the first public showing of E. I. du Pont de Nemours & Co.'s newest experimental fiber made of Teflon, which is a polytetrafluorethylene polymer.[1]

Approximately 70 companies producing basic engineering materials exhibited their products, many of which were rubber or plastic compounds or their finished forms.

The Conference heard experts from all fields, from research to management, discuss subjects of interest to industry. Of particular interest was a panel session, "How, When, and Where to Use Non-Metallic Materials," in which rubber was represented by J. H. Faull, Jr., consultant to the Office of Naval Research, and plastics by Jesse H. Day, editor of the *SPE Journal*.

Exhibitors of raw materials useful to the rubber and plastics industries were du Pont which, in addition to the Teflon fiber, showed many typical uses for neoprene and Hypalon, rubber coated nylon and rayon sheeting, special fibers for reinforced plastics, belting carcasses of nylon, Cordura, and Dacron, and fire hose of Dacron; Goodyear Tire & Rubber Co., with its new Plio-Tuf[2] Pellets (dispersions of color pigments in Plio-Tuf G75C resin, a high-styrene copolymer), Pliovic polyvinyl chloride resins including the dry blending varieties, and Pliobond adhesives; Firestone Plastics Co., with Exon vinyl resin applications; M. V. Kellogg Co., with displays of Kel-F fluorocarbon plastic applications; and Rohm & Haas Co., with Plexiglas acrylic molding powders and Paraplex polyester resins and their many uses.

Kellogg announced at the Exposition that price reductions on Kel-F, ranging from 22-42%, had been effected.

Partly fabricated materials available for further industrial uses were exhibited by Gamble Bros., Inc., with Gam-En-Wood, a new flooring material made by bonding Enrup (United States Rubber Co. rubber-based plastic) to solid or laminated hardwoods; Acadia Synthetic Products Division of Western Felt Works, with synthetic rubber specialties, silicones, and plastic sheeting; Toyad Corp., which performs development service for molded foam rubber and plastics; Synthane Corp., with molded-macerated parts, molded-laminated parts, metal-clad laminates, and silicone-glass laminates; Dow Corning Corp., with silicone products; Westinghouse Corp., with Micarta applications; Amos Molded Plastics Co., with custom injection moldings; and Polymer Corp., with nylon in stock shapes (for fabrication on metal-working equipment), Nylasint nylon powder (for molding by powdered metal techniques), Telflon stock shapes, and a new high-temperature cross-linked styrene.

[1] This new fiber will be described in our New Goods department next month.

[2] See p. 362.

Cellulose Acetate Tinsel Available

The manufacture of cellulose acetate tinsel in a complete range of formulations and colors has been resumed by Celanese Corp. of America, New York, N. Y., after a lapse of several years. The company cites the reason for the resumption as the great trade demand for the material.

L & N Instrument Plant Planned

Plans to construct an instrument plant having 250,000 square feet of floor space have been announced by Leeds & Northrup Co., Philadelphia, Pa. To be situated approximately 22 miles from Philadelphia in North Wales, Pa., the new facility will cost in excess of $4 million when completed in the latter part of 1955. Approximately 1,300 of the company's 3,100 employes will eventually work at the new location.

Plans for the new plant are being prepared by Giffels & Vallet, Inc., with Louis Rossetti as architectural associate, and construction is scheduled to begin in the early fall.

Three-Mile Conveyor Belt Possible

Super Ustex-Nylon, a conveyor belt which uses a new type of chemically treated cellulosic yarn in the longitudinal direction and nylon in the crosswise direction, has been introduced to the mining industry by United States Rubber Co., Rockefeller Center, New York 20, N. Y. It is claimed to make possible for the first time the construction of a continous belt three miles in length as a result of the extreme strength of the cellulosic fabric.

Such strength, the company states, exceeds that of rayon belt fabric by three times and that of cotton duck by 3½ times. The only carcass material in its strength range is steel cord, according to the manufacturer, but steel has the disadvantage of corroding in time.

Recommended for use in underground mining operations where it would eliminate numerous transfer points and the corresponding wear on the belt, the new unit can also be employed above the surface where flat or slightly sloped traverses are encountered. As an example, the company states that a slope belt conveyor using a 46-inch Super Ustex-Nylon belt and rising more than 800 feet in three miles is now entirely possible.

Requirement for Purchasers of RFC Synthetic Rubber for Export

Purchases of any synthetic rubber, including latices, from the Reconstruction Finance Corp., such materials being destined for subsequent export, are now required to contain a guarantee that the rubber will be exported and that the purchaser will arrange for and pay all charges in connection with transportation of the rubber from the producing plant to the destination specified on the shipping order.

In addition, the purchaser must be capable of submitting to the corporation, upon request, satisfactory evidence that the rubber was in fact exported. Otherwise he will have to pay the RFC any difference between the uniform freight charge and the freight charges actually paid thereon to the first destination.

These stipulations, formalized into a statement, must be stamped or typed on the face of the purchase order or must be contained in the order submitted by telegraph or teletype, according to a corporation announcement. This requirement is in addition to the inserts now required to be found on the face of purchase orders.

Footwear Firms Offering Fellman Anti-Slip Neoprene Sole

An anti-slip sole design for shoes, originally developed for use aboard aircraft carriers of the United Sates Navy by personnel who work on the wet, icy, and oily flight decks, is now being offered on a wide variety of footwear to civilians. Workmen, sportsmen, and anyone else interested in reducing the safety hazard of slippery surfaces can now benefit from the advantages of the "Tri-Vac" sole.

The sole pattern, consisting of individual units of three concentric circles each, and functioning with a "squeegee" action, was invented by A. C. Fellman, a long-time consultant on shoes for the Navy. The service adopted the tread as standard and has since used it on more than a million pairs of footwear. The Navy also requires that such soling material be made of neoprene rubber, product of E. I. du Pont de Nemours & Co., Inc., because of the resistance of that rubber to the effects of oil and gasoline.

already found application in the all-weather chukka height boots of Owens Shoe Co., Salem, Mass. Previously available only to the Navy, these boots are intended for wear both as a casual shoe and as an industrial workshoe where toe protection is not mandatory.

More conventional workshoes than the naval type are also available from Owens with the new type neoprene soling. These include both oxford and "high top" models with plain toes. Steel toe equipped shoes are available in this line, however, but from other manufacturers (Record Industrial Co., Philadelphia, Pa., and C. A. Eaton Shoe Co., Brockton, Mass.).

For cold weather applications, Owens is also putting out fleece-lined boots and shoes. In the sports field, E. E. Taylor Corp. is currently distributing yachting moccasins made with waterproof leather uppers and synthetic rubber soles or neoprene soling with the Tri-Vac design.

Torture Tests on Tubeless Tires

A series of torture tests which demonstrated the serviceability of tubeless tires under the most severe conditions was held recently by The Firestone Tire & Rubber Co., Akron, O. As a result of these tests, which were intended to show the many advantages of modern tubeless tires over conventional tires with tubes, the company concluded that the tubeless unit is definitely the tire of the future.

Beginning with fast cornering at 65 mph., through a 90-degree turn with tires deflated to 14 pounds pressure, the test program continued with emergency brake stops at 60 mph., reverse spins at full speed in reverse and second gear, and tight circles at maximum speed in second gear with air pressure down to 12 pounds. The final test performed was driving the tubeless tire-equipped automobile over hurdles at a speed of 60 miles per hour, prior to which performance nails had been driven into the tires.

Footwear Having Neoprene Tri-Vac Soling Includes Conventional Workshoes by Owens Shoe Co. *(Left)* and Boots and Overshoes by Bristol Mfg. Co. and Tingley Rubber Corp., Respectively *(Right)*

Mr. Fellman, to make the development available to civilians, recently formed Fellman Tri-Vac Footwear, Inc., 19 W. 44th St., New York, N. Y., and has licensed Bristol Mfg. Co., Bristol, R. I., to use the pattern on rubber and canvas vulcanized footwear. He has also licensed Tingley Rubber Co., Rahway, N. J., to manufacture molded overshoes and Avon Sole Co., Avon, Mass., to produce soles and heels for consumption by shoe fabricators.

Britol will soon offer three types of boots with the Tri-Vac sole (see illustration) and plans to extend the use of the pattern to industrial and sporting lines with galoshes, basketball shoes, canvas topped yachting shoes, and thermal boots (for use in very cold climates).

Tingley is currently manufacturing neoprene Tri-Vac overshoes for civilian consumption. These are the same products currently being used by the Navy and are expressly directed toward workmen who operate where chemicals and solvents may be on the floor. The overshoes are elastic and snug fitting and are constructed without the usual fabric liner to cut down on weight.

The soling materials made by Avon have

Bus with Four-Wheel Rubber Suspension

The bus of the future, reported to be the first ever made with all four wheels suspended on rubber and the front wheels independently sprung with no front axle, has been introduced by Flxible Co., Loudonville, O., as a prototype for future models of intercity highway buses. The new 29-passenger Visacoach, as the vehicle is called, has "knee action" in the front end as a result of the independently sprung front-wheel design; such action is standard on passenger cars, but never before has been available in buses, according to the company.

The rubber springs employed on the vehicles are Goodrich Torsilastic units, consisting of a metal shell and central shaft, with the intermediate space filled with rubber bonded to the metals. Rotation of the shell or shaft while the other is held stationary, twists the contained rubber in order to provide the necessary springing action.

Surco Yellow Label, Pliolite-Cement Surface Coating

A compound which will preserve and protect concrete and other cement-type building materials has been developed by Surface Coatings, Inc. Composed of a cement base and a special styrene-butadiene latex (Goodyear's Pliolite), the new substance is reported greatly to improve the wearing qualities of concrete, mortar, and plaster surfaces by increasing their resiliency, their water resistance, and their elasticity.

Surco Yellow Label, as the new material is called, will stand up under heavy vibration or impact while adhering to steel, glass, block, or concrete, according to the company. Its unusual toughness and adhesive properties are credited to the use of the latex emulsion binder to replace much of the water normally used in cement mixes. Principal applications of the substance include covering floors, lining swimming pools and acid resistant tanks, making plaster waterproof, and others.

Fuel Cell for Jets Developed by Goodyear

A lightweight fuel cell which forces gasoline out to the jet engine of the Regulus guided missile (used in action against surface targets from ships or land) has been developed by Goodyear Tire & Rubber Co., Akron, O. Said to be 25 pounds lighter and less expensive than previous cells, the new unit is claimed to provide an even flow of fuel to the jet engine at all altitudes without the use of fuel pumps. Earlier models of the missile required three fuel pumps to insure smooth operation.

The cell consists essentially of two units, the secondary one laced to the main fuel-containing unit and containing compressed air from the engine's compressor. Made of rubberized fabric, the main unit slowly collapses under the air pressure to emit a constant flow of fuel. A series of rubber tubes, installed on the inside to minimize air pockets as the cell empties, is said to insure complete availability of all fuel in the cell as the level drops and to keep air out of fuel lines.

Orcoflex Auto Floor Mats from Ohio Rubber Co.

A colorful new automobile floor mat called Orcoflex, that reportedly withstands more than 40 times as much passenger wear as mats now used, is being introduced by Ohio Rubber Co., Willoughby, O. These wear qualities, plus greater color brilliance and color range, are said to be obtained by spraying the rubber with a special compound developed by Empire Varnish Co., using Goodrich Chemical's Geon vinyl latex. Some major automobile manufacturers are placing the mats in their 1954 lines, and many other auto makers have them under test for 1955, according to a recent announcement.

Vacuum Impregnation, Potting Services by Bacon Industries

The formation of a new department to handle the vacuum impregnation of electrical components and the devlopment of a new potting compound for encapsulation of electrical units (within the company's potting service) have been announced by Bacon Industries, Inc., Watertown, Mass.

The new department is set up to do both prototype work and large-lot impregnations using standard and special compounds. The same capacities are available with the potting department where the new compound, having a thermal coefficient of linear expansion 3-5 times less than that of commercially available material and having excellent resistance to thermal cycling from —70 to +160° F., can be obtained, it is claimed.

Foxboro Building New California Factory

Ground has been broken for a new branch factory to be erected in San Leandro, Calif., by The Foxboro Co., Foxboro, Mass. Scheduled for completion by August 15, the 8,400-square foot building will help the company's existing San Francisco shop in the manufacture, sales, and service of instruments and accessories.

Government Suppliers Cautioned on Minimum Quantity Bids

Since a government contracting officer can make awards on any item for a quantity less than the quantity bid on at the unit price unless the bidder specifies otherwise, and since he cannot make awards of less than the minimum quantity unless the bidder specifies this possibility, the New York Quartermaster Purchasing Agency, 111 E. 16th St., New York 3, N. Y., has advised all suppliers to keep their minimum quantity bids as low as possible.

The Agency, in a recent announcement, also advised that bidders not indicate capabilities in excess of actual capacity. Pre-award surveys are performed by the NYQMPA to insure the bidder's capability to produce each month's delivery requirement, and suppliers are eliminated from competition if they indicate a minimum quantity above their actual capacity.

Glove Contract Awarded

NYQMPA has also announced that a contract for the United States Air Force has been awarded to The Pioneer Rubber Co., Willard, O., to supply 10,340 pairs of protective rubber gloves for vesicant gas. Price of the gloves ranges between $3.27-3.49 per pair, making the total value of the contract $34,347.70.

Tenth Anniversary Expansion at Fargo Rubber

Celebrating its tenth year in business, Fargo Rubber Corp., Los Angeles, Calif., recently announced the opening of a new building to house additional equipment and laboratory facilities. The laboratory will perform research and development work on all types of rubber compounds, including unique compounds for specific applications and specialized rubber hydrocarbons for rubber-to-metal bonding.

Truck Tires with Royalon Cord

Royalon, a high tensile strength cord, is now being used in the large-size Fleetway tires of the United Sates Rubber Co., Rockefeller Center, New York 20, N. Y. Advantages gained by use of the new cord are increased strength without any increase in thickness or weight, and 79% more resistance to flexing fatigue, according to the company.

There is also reported a 20% gain in the rupture resistance of the new Fleetway. Customers will benefit from the use of the Royalon cord without being required to pay any increased cost for the tire.

Riverside Plastics in New Plant

Operation of its new plant in Hicksville, Long Island, N. Y., was recently begun by Riverside Plastics Corp., formerly of New York, N. Y. The firm is engaged in the custom molding and fabrication of reinforced plastics, primarily in the aircraft and electronic industries.

Located on a 3½-acre plot with capacity for future expansion, the new building contains 16,000 square feet of floor space, especially designed for the firm's activities. Plastic items up to 30 feet long can be fabricated in the plant, which also houses the research facilities of the firm.

Goodrich Lightweight Conveyor Belt Line

A new line of lightweight industrial conveyor belts, including Koroseal belts and others with an "eye-rest" green color for inspection service, has been announced by The B. F. Goodrich Co., Akron, O.

The Koroseal unit, with its smooth nonporous surface that resists flaking or checking, features excellent resistance to abrasion, oils, and most acids. The green-colored belts, designated "Highseal" and "Kleenseal," are intended for light industrial applications where their color is said to increase inspection efficiency by reducing glare and eye strain. A new "Economy" black belt, designed for low-cost operation and to reduce maintenance problems caused by excessive changes in belt length, completes the line.

A new fabric identified as C. P. special conveyor fabric, is used for the first time in this belt line. The fabric is represented as having high resistance to moisture, when impregnated with special compounds, and long flex life even when operated over small pulleys.

Oakite Has Best First-Quarter Period in History

The billings written during the month of March and during the entire first quarter of this year were the highest of any other month and first-quarter period in the history of Oakite Products, Inc., 19 Rector St., New York 6, N. Y., according to a recent statement of the company. These statistics, presented at the firm's annual stockholders' meeting, confirmed the optimistic forecast voiced last January by the president, John A. Carter.

In addition to hearing these figures and a report of the progress made by the company last year, the stockholders unanimously reelected to the board of directors the following four men: J. J. Basch, David X. Clarin, Eustace Lingle, and Charles F. Radley.

Materials Handling Show for 1955

The next Materials Handling Exposition will be held during the week of May 16, 1955, in Chicago, Ill., and will occupy the largest indoor exhibit space available in the nation, according to the show's producer, Clapp & Poliak, Inc., New York, N. Y. Both the International Amphitheatre and the new exhibition hall now under construction will be used to house the show, theme of which will be "The Concept of Obsolescence."

Reclassification of Two Chemigum Latices

In order to be consistent in designating all styrene-butadiene type latices in the Pliolite group and all butadiene-acrylonitrile type latices in the Chemigum group, two latices listed in the Chemigum series have been reclassified under Pliolite by the chemical division of Goodyear Tire & Rubber Co., Akron, O. Chemigum Latex 101A and Chemigum Latex 101AX will henceforth be designated Pliolite Latex 101A and Pliolite Latex 101AX, respectively.

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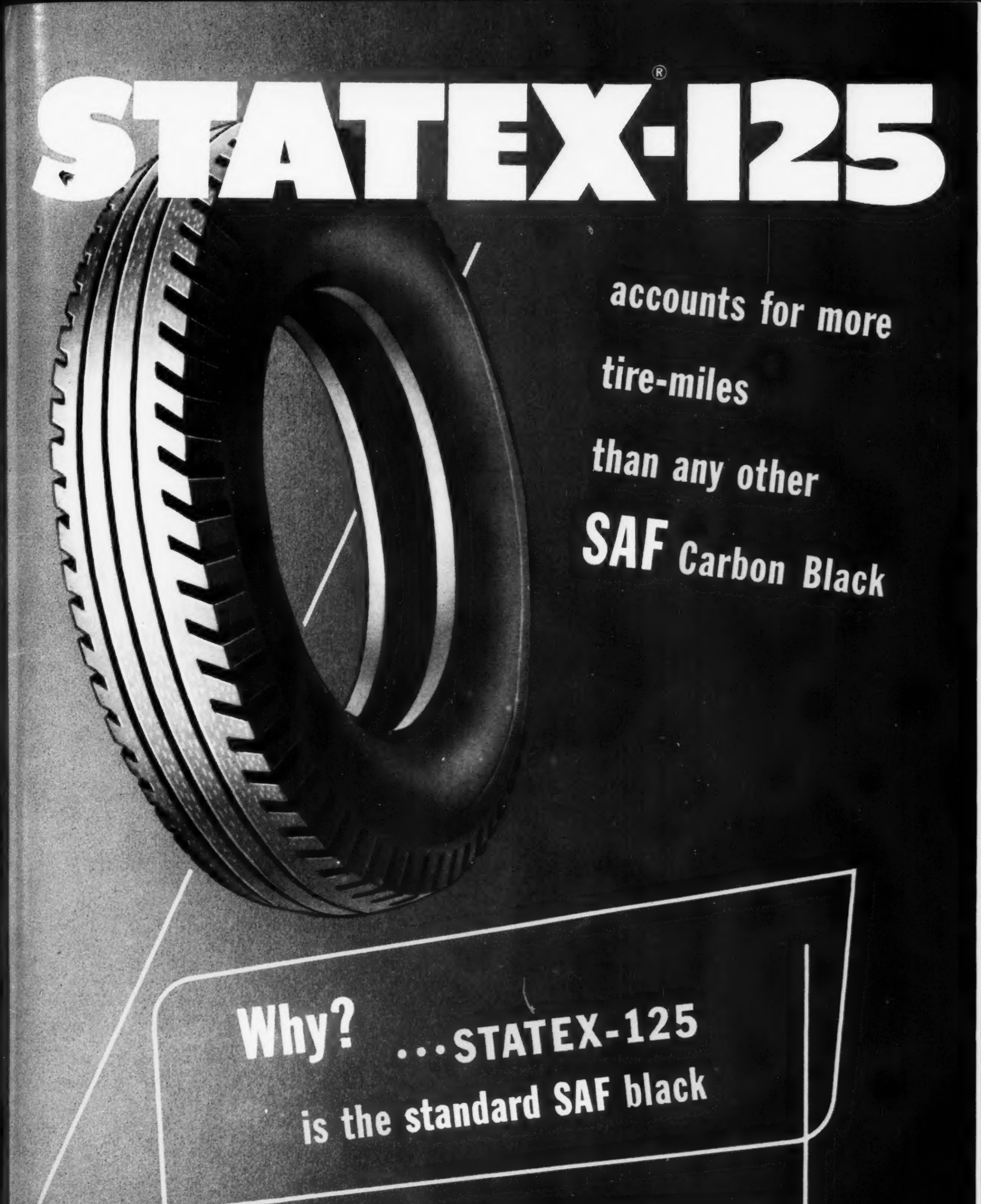
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General Aniline Constructing Acetylene Plant

The high-pressure, commerical manufacture of acetylene and its derivatives is being undertaken by General Aniline & Dye Corp., New York, N. Y., with the beginning of construction of a plant in Calvert City, Ky. Reported to be the first such unit in this country, the high-pressure facility will cost an estimated $6,000,000 when completed in late 1955.

(The Calvert City community was turned into an industrial center last year when three large chemical organizations began operating three independent, but somewhat integrated plants. These were the chlorine-caustic soda facilities of the Pennsylvania Salt Mfg. Co., the calcium carbide and acetylene generating plant of the National Carbide Co., and the vinyl chloride manufacturing unit of the B. F. Goodrich Chemical Co.)

The General Aniline plant will concentrate initially on the production of the PVP (polyvinyl pyrrolidone) family of acetylene derivatives, including propargyl alcohol, butynediol, butanediol, butyrolactone, pyrrolidone, methyl pyrrolidone, vinyl pyrrolidone, and polyvinyl pyrrolidone. These chemicals, although still relatively new to the American industry, have achieved varied uses in such applications as synthetic fibers, plastics, plasticizers, solvents, and others.

The plant, designed for easy expansion, will subsequently be equipped to produce vinyl alkyl ethers and esters and their polymers. Currently under sales development by the company, this series of compounds includes methyl vinyl ether, ethyl vinyl ether, dimethyl chloracetal, polyvinyl methyl ether (PVM), and methyl vinyl ether-maleic anhydride copolymer (PVM/MA). Among the applications of these materials are polymers and copolymers used in adhesives, film formers, and latex gelling agents.

Structural Changes in Goodyear Oil Hose

Several types of oil suction and discharge hose produced by Goodyear Tire & Rubber Co., Akron, O., have been modified in their structure. These changes include the replacement of the flat reinforcing wire previously used on both the Thor "S" smooth bore OS&D hose and the Thor Super Submarine hose, with a round steel wire to improve kink and crush resistance.

The company also announced the addition of Style MH Submarine OS&D hose to the commercial line for use in handling high aromatic fuels.

NSC Accident-Free Operation Awards

Two National Safety Council awards for accident-free operation have been made to U. S. Rubber Reclaiming Co., Buffalo, N. Y. Both were presented to processing plant #2 at Cheektowaga, N. Y.

The first award, a Certificate of Commendation, was given in recognition of plant operation from June 23, 1952, to December 31, 1953, without a single accident. The other award, a plaque, was for the accident-free performance of the plant in the NSB classified division. A copy of the Certificate, attached to a key chain, will be distributed to all of the plant's employes to personalize the honor.

Harry M. Brubaker

Witco Rubber Chemicals Division Formed

The formation of a rubber chemicals division and the election of Harry M. Brubaker as vice president in charge of the new division have been made public by Witco Chemical Co., 295 Madison Ave., New York 17, N. Y. Mr. Brubaker, who joined Witco in 1951 as assistant sales manager of the carbon black division after having been previously associated with The B. F. Goodrich Co., Phillips Chemical Co., and Sid Richardson Carbon Co., will make his headquarters with those of the division in Akron, O.

The rubber chemicals division will be responsible on a national scale for sales to the rubber industry of the company's carbon black, Sunolite anti-sunchecking wax, softeners, and other products.

It will cooperate with Witco's 11 sales offices throughout the company, including the recently opened office at 1447 Peachtree St., Atlanta, Ga. This office, which will serve markets in the Southeast, is headed by Clement Damen, a member of the sales department since 1924 and recently in charge of the firm's Washington office.

South's First Rubber Products Plant Celebrates

The twenty-fifth anniversary of Goodyear Tire & Rubber Co.'s Gadsden, Ala., plant, said to have been the first rubber products plant south of the Mason-Dixon Line, was celebrated May 14-15 with open house and a barbecue for 12,000-15,000 persons at that location. Highlighting the event was a congratulatory address by E. J. Thomas, company president, to employes and their families and presentation of lapel pins to 20 employes who have completed 25 years of service with the Gadsden plant.

With the production of an automobile tire on June 21, 1929, the plant began to turn out rubber products for consumers. The plant's 70 millionth tire was produced on May 14, 1954. The plant has expanded its operation to include by now tubes, shoe products, and military materials and has increased its employes to more than 3,000, making the Gadsden unit the second largest plant in the giant Goodyear organization.

Monsanto-Farbenfabriken Bayer Firm Incorporates in Delaware

Mobay Chemical Co., equally owned firm of Monsanto Chemical Co., St. Louis, Mo., and Farbenfabriken Bayer, A. G., Leverkusen, Germany, has been incorporated in Wilmington, Del., with David L. Eynon, of Monsanto, as president. The company will manufacture isocyanate compounds for use in producing rigid or flexible porous plastics, synthetic rubber formulations, fibers, and adhesives.

In addition to the election of Mr. Eynon to the presidency, the directors of the firm were made public. These include Mr. Eynon; John L. Gillis, of Monsanto; Oskar Loehr, of Farbenfabriken Bayer; Edward M. Pflueger, of Naftone Co. (New York, N. Y.); and J. Russell Wilson, of Monsanto.

Mobay's president had previously been assistant to a vice president of Monsanto before accepting his present post. The other Monsanto personnel are vice presidents of the St. Louis firm: Mr. Gillis, in charge of marketing; and Mr. Wilson, general manager of the company's research and engineering division. Dr. Loehr is a member of the executive committee of the German concern; and Mr. Pflueger is president of Naftone, a trading and importing company.

"Voice of Firestone" Discontinued

The "Voice of Firestone," a concert program of the Firestone Tire & Rubber Co., Akron, O., which has been broadcast over the radio and television facilities of the National Broadcasting Co. from 8:30-9:00 on Monday evenings, has been discontinued. The program has been heard on radio for the past 25 years, the last five of which have been simultaneous with the television broadcast.

In a recent announcement to this effect, the company "expressed regret" at leaving NBC, explaining that the move was necessitated by the fact that the 8:30 time would not be available on Monday night, and that "no other evening television network time will be offered."

It is reported that Firestone plans to take both radio and television time with another network to continue the "Voice" broadcast, but no official announcement of this plan has been made.

Plastics Molding Expanded at G-E

The first phase of the General Electric Co.'s plastic expansion program, consisting of the addition of approximately 5,000 square feet office space and tool-making facilities at the Taunton, Mass., plastics plant, has recently been completed.

An additional expansion, this one at the Decatur, Ill., plant and providing for some 17,000 square feet of manufacturing and warehousing space, is slated for completion by July 1.

The company believes that with these expansions General Electric will have the largest plastics custom molding facilities in the nation. The increased capacities of the two plants, intended in the case of the Taunton facility to accommodate the manufacture of new molds, will permit all steps of mold design and manufacture, and plastics design and manufacture, to be coordinated under one roof.

Phillips AEC Reactor Open to Public

The Atomic Energy Commission has announced the availability to the public on a limited basis of the specialized facilities of the Materials Testing Reactor at the Idaho Falls, Idaho, Testing Station. Operating this installation for the Commission is Phillips Petroleum Co., Bartlesville, Okla.

Private research and industry may now have certain experimental services performed with the Reactor at relatively low cost. Similar services have been available in the past at other AEC Stations, but this Reactor is unique in that it can produce isotopes with higher specific radioactivity than any of the other public units.

Large Silicone Window Gasket by Bacon

One of the largest silicone rubber window gaskets ever made has been molded of Silastic 152 by Bacon Industries, Inc., Watertown, Mass., for the Climatic Laboratory of the United States Army. Designed to stretch over the edges of a metal framed window, the gasket has the inside dimensions of 24 by 24 inches, with a 4¾-inch deep channel and a cross-section thickness of approximately ¾-inch.

A special mold and a special curing oven were built for the job. The mold was a single-cavity, one-piece unit. The molded product required seven days, using step-grade temperature increases, to accomplish the cure.

Resin-Rubber Pipe for Water In Successful Operation

Resin-rubber plastic pipe, carrying a concentrated brine solution, has passed trial tests and is now in constant operation in a water softening service plant in Winona, Minn. The pipe is made of Kralastic, a product of Naugatuck Chemical division, United States Rubber Co., Naugatuck, Conn.

It replaced copper and galvanized iron pipe in this application and was installed in half the time required for metal, according to the company. Its cost is reported to be less than that of copper and about equal to that of galvanized iron, but it has the advantages of being unaffected by the corrosive brine solution or by electrolytic action.

Continuous Vinyl Foam Sheeting Plant

Commercial production of continuous foam vinyl sheeting at the plant of Kyfoam, Inc., believed to be the first such installation, is scheduled to begin July 1 in Louisville, Ky. The process for foaming vinyl resin-based plastisols, developed by Elastomer Chemical Corp.,[1] is employed, according to Kyfoam, with curing of the material accomplished electronically by high-frequency apparatus.

The sheeting will be marketed in widths up to 54 inches, thicknesses up to 4½ inches, and in any desired length. It will be formulated to serve the individual requirements of the user, and will be made available in white or any specified color.

[1] See our Feb., 1954, issue, p. 628.

OBITUARY

Harry M. Frecker

Harry M. Frecker

DEATH came unexpectedly, on May 3, to a well-known figure in the mechanical rubber goods industry, Harry M. Frecker, manager of commodity sales for the mechanical goods division of the United States Rubber Co. He was 50 years old.

Mr. Frecker, who had been with U. S. Rubber for the last 32 years, was appointed to manager of commodity sales in March, 1952. Prior to that time he had been development manager of the Passaic, N. J., plant.

A native of Passaic, Mr. Frecker was educated in Passaic schools and Polytechnic Institute of Brooklyn.

He started his career as a clerk in the New York Belting & Packing Co., an affiliate of U. S. Rubber, in 1922, and then held a succession of laboratory and development posts, and in 1949 he was appointed development manager of the Passaic plant.

The deceased was active in industry and professional organizations including the Mechanical Goods Division, The Rubber Manufacturers Association, Inc.; American Chemical Society; and various local rubber groups. During World War II he was a technical consultant on mechanical goods to the Office of the Rubber Director, Washington, D. C.

Funeral services were held in Ridgewood, N. J., on May 5.

Survivors include his wife, a son, and a daughter.

Walter N. Bangham

PERITONITIS, following an appendectomy, caused the death recently in Sumatra of Walter N. Bangham, an authority on rubber plant breeding, author, and former director of plant research for Goodyear Rubber Plantations Co. Lately a consultant, he was in Sumatra on a special assignment for Goodyear.

He was born in Wilmington, O., on May 4, 1903. He was graduated from Ohio State University in 1926 and obtained an M.S. from Harvard University in 1929, when he was first sent to Sumatra by Goodyear. Mr. Bangham was a winner of the William F. Sheldon Traveling Fellowship for the study of botany and agriculture.

The deceased also served as chief botanist in 1939 at Goodyear's Costa Rica plantation, and he was a member of the Inter-American Institute of Agricultural Sciences at Turrialba, Costa Rica.

He left Goodyear plantations in 1947 to become editor of *La Hacienda* in New York, a magazine devoted to tropical agriculture, but continued to serve the rubber company as a consultant.

Besides his many articles on rubber plant breeding and disease control, Mr. Bangham won renown for the development of the budgrafting operation which considerably increased yields on Goodyear's Sumatra plantations and which were adopted in Indonesia.

He leaves his wife, his mother, a brother, and a sister.

Abraham Sydeman

ABRAHAM SYDEMAN, pioneer manufacturer of coated, impregnated, and molded rubber products for the shoe, garment, and electrical trades, died on April 21 at his home in Jamaica Plain, Mass., at the age of 97. Prior to his retirement six years ago, he was treasurer of Stedfast Rubber Co., Boston, Mass., a firm he had established when he was 67 years old.

Born in Poland, Mr. Sydeman moved to England and then to the United States in his early years. He began in this country as an apparel salesman, but later opened stores in three Massachusetts cities. At the turn of the century he took over a rubber company in Stoughton, Mass., and after outgrowing its quarters there moved to Canton, Mass., where he established the present Plymouth Rubber Co. He was one of the first manufacturers to promote rubber heels for men's shoes.

Relinquishing control of Plymouth in 1919, Mr. Sydeman remained inactive for only five years when, in 1924, he established the Stedfast organization. Under his management, the company expanded into England and Canada, and its products were marketed all over the world.

He is survived by two daughters.

Harry A. Astlett

HARRY ANDERSON ASTLETT, founder of the crude rubber importing firm of H. A. Astlett & Co., Inc., New York, N. Y., died on May 11 in Montclair, N. J., at the age of 86. He had been senior partner of the firm that bore his name until his retirement in 1942.

Mr. Astlett was born in Devonshire, England.

He traveled to Brazil in his early twenties for a Liverpool merchant house and arrived in this country at the age of 27 as a member of Shipton Green & Co. He soon became a partner of that firm and was made the senior partner when Mr. Green retired. In 1896 he changed the name of the firm to its present form.

Mr. Astlett was a former president of the Rubber Trade Association and a former director of the Commodity Exchange of New York, and of the first National Bank & Trust Co. of Montclair, where he had lived for many years. The deceased was also a leading amateur orchid grower and vice president of the National Orchid Society.

He is survived by a son and a daughter.

NEWS ABOUT PEOPLE

W. W. Frymoyer

W. W. Frymoyer has been elected a vice president of The Foxboro Co., Foxboro, Mass. He joined the firm in 1926 as director of research and was appointed general superintendent in 1939. Since 1951, Mr. Frymoyer has been factory manager, a position in which he remains and which entails supervision of all instrument manufacturing activities of the company.

B. B. Countryman was named vice president, purchasing division, and **I. R. Hansen** was elected assistant treasurer of the Minnesota Mining & Mfg. Co., St. Paul, Minn. Mr. Countryman joined 3M as purchasing agent in 1928 and became director of purchases in 1942. Mr. Hansen joined the company in 1943 as assistant controller.

P. J. Koch, with The Firestone Tire & Rubber Co., Akron, O., since 1925, has been appointed cashier of that company.

Fred M. Pugh has been appointed manager of the midwestern sales district of General Electric Co.'s silicone products department. Mr. Pugh joined G-E in 1947 and has been silicone sales engineer and silicone product salesman for the company.

C. J. Schmidt, who has been in charge of the Detroit office of J. O. Ross Engineering Corp., has been made vice president in charge of sales and will move his headquarters to the company's main office in New York, N. Y. Mr. Schmidt has been with Ross for 24 years, 20 of which have been spent as manager of the Detroit office.

H. W. Rollman recently returned from an eight-week round-the-world trip. He reported that during his absence a great number of inquiries about the Vertical Shoe Alliance has been received, making probable a meeting of interested parties at the Chicago Shoe Show to further discuss the project. Mr. Rollman proposed the Alliance idea before he left on his trip.[1]

[1] For details, see our Mar., 1954, issue, p. 804.

Victor Vodra, formerly a sales manager of Wyandotte Chemicals Corp., has become associated with Wooster Rubber Co., Wooster, O., in the newly created capacity of technical director. Mr. Vodra, who will coordinate the design, chemical, and quality control activities at Wooster, is well known in the rubber industry as an author and lecturer. He had served as Pacific Coast representative of R. T. Vanderbilt Co. and as general manager of Griffith Rubber Mills and had operated his own business, The Northwest Research & Development Co., before joining Wyandotte.

Victor Vodra

Robert E. Workman, assistant to the general manager of Goodyear Tire & Rubber Co.'s chemical division, recently addressed the annual convention of the Pacific Northwest Paint & Varnish Club at Vancouver, B. C., Canada.

Jack E. Bolt has been named application engineer in the phenolics engineering unit, chemical materials department, of General Electric Co.'s chemical division, Pittsfield, Mass. Mr. Bolt joins G-E after a three year tour of duty with the Navy, prior to which he had been a metallurgist and supervisor at American Brake Shoe Co.

J. C. Pullman has been appointed assistant to the manager of the new product development department of American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N. Y. Dr. Pullman joined the department in 1952, prior to which time he was concerned with the development of chemicals for the paper converting industry at the company's Stamford, Conn., research laboratories.

Ray P. Dinsmore, vice president in charge of research and development of the Goodyear Tire & Rubber Co., Akron, O., has been elected a term member of the Massachusetts Institute of Technology Corp., governing body of MIT, Cambridge, Mass. Dr. Dinsmore will serve as a term member for five years, the membership is equivalent to trusteeship of a university.

Alan S. Evans, Jr.

Alan S. Evans, Jr., has been elected vice president in charge of sales of Neville Chemical Co., Pittsburgh, Pa. He was formerly manager of the coal chemicals division of Pittsburgh Coke & Chemical Co. Mr. Evans had been with Pittsburgh Coke since 1942 in the coal chemical organization. He is an active member of the American Coke & Coal Chemical Institute and other chemical organizations.

Rodolfo Low, chief chemist of Productos De Caucho Villegas, S. A., recently toured the Seiberling Rubber Co.'s Akron, O., plant under the direction of Seiberling's chief chemist, Ralph LaPorte. Dr. Low will spend six weeks in Akron studying compounding and development processes for the Bogota, Colombia, concern, which was recently organized to made Seiberling tires.

Harry T. Fogg, formerly general sales manager of Hall Rubber Co., has been appointed New England representative of The Bearfoot Sole Co., Inc., Wadsworth, O. Mr. Fogg, who has been selling rubber soles and heels since 1920, will be located at the firm's Boston, Mass., office.

Howard Lee Young has been elected vice president of both the American Zinc Sales Co. and the American Zinc Oxide Co., wholly owned subsidiaries of The American Zinc, Lead & Smelting Co., St. Louis, Mo. Mr. Young joined the sales company in 1937 and served through the posts of salesman and central district manager until 1951, when he was made manager of metal and acid sales.

J. P. Milionis has joined the new product development department of American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N. Y., in which position he will introduce new products to the chemical industry and will be concerned with general development projects of the company. Dr. Milionis joined Cyanamid in 1951 and served as a research chemist until this promotion.

Joseph A. Neubauer

Joseph A. Neubauer, technical director for Columbia-Southern Chemical Corp., and **David G. Hill,** vice president in charge of glass manufacture for Pittsburgh Plate Glass Co. (parent company of Columbia-Southern), have been elected to membership on the chemical company's board of directors. Mr. Hill's election fills a vacancy created by the retirement of **Emmet D. Griffin;** Mr. Neubauer's election increases the board's membership from 10 to 11 members. Mr. Neubauer joined the company in 1933, later serving as development engineer and assistant production superintendent at the Barberton, O., plant. He was works manager of the chlorine-caustic soda facility at Natrium, W. Va., and became technical adviser to C-S in 1946 and technical director of the company in 1949.

Joseph Sterling has been named sales manager in charge of industrial accounts for Rubarite, Inc., a recently formed company jointly owned by The Goodyear Tire & Rubber Co., National Lead Co., and Bird & Son, Inc. Mr. Sterling has long been associated with the rubber and asphalt industries, formerly having been assistant sales manager for Bearfoot Sole Co., consultant to the Rubber Division of the Office of Price Stabilization, and manager of special products for U. S. Rubber Reclaiming Co.

T. H. Winkeljohn has been made chief engineer, and **Forrest Fleck** has been promoted to factory superintendent in charge of all production at the Wabash, Ind., plant of The General Tire & Rubber Co. Mr. Winkeljohn, a veteran of 12 years with the company, will continue to serve as a consultant to the other industrial products division plants of the firm on problems relating to plant engineering. Mr. Fleck has been with the company since 1937, during which time he has held various production assignments.

John A. Sherred has been appointed director of research development for the plastics division of Monsanto Chemical Co. Born in England, Mr. Sherred joined the company in 1947 in the Texas City, Tex., plant and has been in charge of development functions in the research department there since 1952. He will now be located in St. Louis, Mo.

Philip R. Tarr has joined the development department of Monsanto Chemical Co.'s plastics division, Springfield, Mass. He transfers from the firm's St. Louis office, where he was assistant to the president and secretary of the executive and finance committees. Mr. Tarr joined Monsanto in 1946 as assistant to the secretary of the executive committee, later becoming assistant to the executive vice president, assistant to the president (1951), and secretary of the two committees (1952).

Frank E. Selz, for the last nine years assistant to the president of General American Transportation Corp., Chicago, Ill., has been appointed vice president in charge of the plastics division of the company. Mr. Selz joined the company in 1931 and served as assistant to the manager of the tank car division from 1934-1945. He is presently secretary and treasurer, as well as a director, of the Society of the Plastics Industry, Inc.

William M. Widenor, formerly with New Jersey Zinc Sales Co., recently joined the polychemicals division of West Virginia Pulp & Paper Co., Charleston, S. C., to do development work on the use of Indulin (pine wood lignin) in rubber.

John Conway, previously in the sales organization of Carbide & Carbon Chemicals Co., has joined Hatco Chemical Co. as sales manager. Mr. Conway will be headquartered in the company's office at Fords, N. J., and will be responsible for all sales and development activities of Hatco.

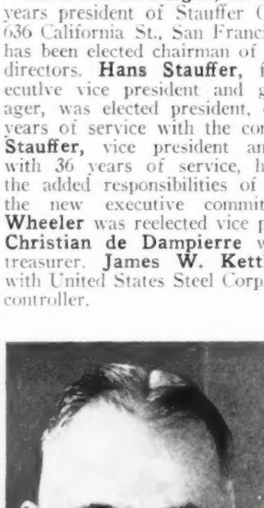
Christian de Guigne, for the past eight years president of Stauffer Chemical Co., 636 California St., San Francisco 8, Calif., has been elected chairman of the board of directors. **Hans Stauffer,** formerly executive vice president and general manager, was elected president, climaxing 34 years of service with the company. **John Stauffer,** vice president and secretary, with 36 years of service, has taken on the added responsibilities of chairman of the new executive committee. **R. C. Wheeler** was reelected vice president, and **Christian de Dampierre** was reelected treasurer. **James W. Kettle,** formerly with United States Steel Corp., was elected controller.

John S. Collbran, Jr., has been named western district sales manager, Chicago office, of The New Jersey Zinc Sales Co., succeeding **David P. Brannin,** who retired after over 40 years of service. Mr. Collbran, a member of the company since 1945, has been assistant to Mr. Brannin since 1952. Mr. Brannin was associated with a subsidiary, Empire Zinc Co., until 1921, when he was transferred to the Chicago office. He later became office manager (1936), district sales manager (1946), and finally western district sales manager for the New Jersey company.

Henry Avery has been appointed manager of the coal chemicals division of Pittsburgh Coke & Chemical Co., Pittsburgh, Pa. Mr. Avery joined the company in 1951 as manager of the plasticizer division and will continue to carry the duties of that position in addition to those involved in his new post.

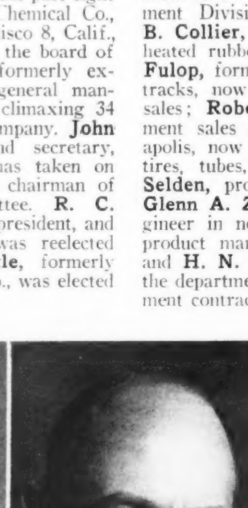
Karl L. Lange, since 1949 assistant operations manager at Wingfoot Lake Airship Base, has beeen appointed manager of the expanding lighter-than-aircraft flight operations at Goodyear Aircraft Corp., Akron, O. In his new assignment Mr. Lange will be responsible for the test and demonstration of the company's new airships now under construction, in addition to duties as head of commerical airship operations. He will be assisted by **Walter B. Birdsall,** formerly in charge of production at Wingfoot Lake, who has been promoted to chief of electronic coordination of LTA operations.

Six men have been named to managerial assignments with the aeronautical department of B. F. Goodrich Tire and Equipment Division. These include: **William B. Collier,** product manager of de-icers, heated rubber, and accessories; **Louis J. Fulop,** formerly product manager of tank tracks, now product manager of Rivnut sales; **Robert J. Reidy,** former equipment sales field representative in Minneapolis, now product manager of airplane tires, tubes, and recapping; **Robert G. Selden,** product manager of fuel cells; **Glenn A. Zimmerman,** former sales engineer in new products department, now product manager of wheels and brakes; and **H. N. Snook,** operating manager of the department and responsible for government contracts and automotive tire pricing.



Gabriel Moulin Studios

Hans Stauffer



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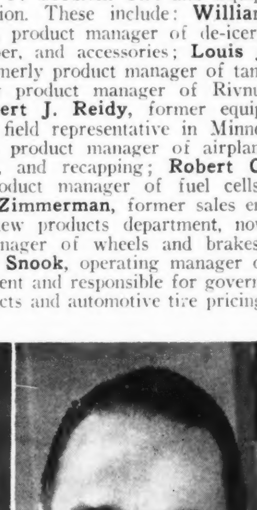


Christian de Guigne

J. E. Quinty

J. E. Quinty, of Emery Industries Inc., recently assumed sales responsibility for all of the company's fatty acids and derivatives, plasticizers, and textile oils in northeastern Pennsylvania and parts of northern New Jersey. Mr. Quinty joined Emery after having been associated with Hercules Powder Co.

W. J. Major, formerly with General Electric Co. in atomic energy work, has been appointed to the chemical sales staff of Emery.

Walter Murken has been appointed production manager of the Quaker Rubber Corp., division of H. K. Porter, Inc., Philadelphia 24, Pa., responsible for the planning and scheduling of all plant production facilities. Mr. Murken, a veteran of 16 years of service with Quaker, was district sales manager for the Philadelphia area prior to his promotion.

Paul A. Fodor, Jr., district sales manager at Philadelphia for Columbia-Southern Chemical Corp., 632 Ft. Duquesne Blvd., Pittsburgh, Pa., has been awarded the United States Department of Commerce's "Certificate of Service" for his contribution to the nation's Industrial Mobilization Program. Mr. Fodor served as Chief of the Inorganic and Agricultural Branch, Chemical Division, National Production Authority, during the past 12 months while on leave from Columbia-Southern.

William Engs, manager of manufacturing of the agricultural chemicals division, American Cyanamid Co., has been appointed assistant to the president of Stauffer Chemical Co., San Francisco, Calif., its subsidiaries and associated companies. Mr. Engs joined Cyanamid in 1941, in which organization he has held such posts as director of the chemical engineering division of Stamford Laboratories and as manager of operations of North American Cyanamid, Ltd.

George J. Wachholz has been appointed controller of the Minnesota Mining & Mfg. Co., St. Paul, Minn. Mr. Wachholz joined 3M in 1936 as a cost accountant, rising to division controller and later assistant controller (1950). In his new capacity he will be responsible for the preparation of budgets and supervision of operating accounting controls and procedures.

L. W. Reeves has been named manager of chemical sales, and **George Hackim** has been appointed manager of vinyl resin sales of the chemical division of The General Tire & Rubber Co., Akron, O. Mr. Reeves, who joined the company in 1951 after associations with Hooker Electrochemical Co., Dayton Rubber Co., and Binney & Smith Co., is now responsible for the sale of products manufactured at General's Mogadore, O., plant. Mr. Hackim, with the company since 1948, was manager of technical service for the division prior to this appointment.

Stein, Hall & Co., Inc., New York, N. Y., has appointed **S. Crawford Bonow** manager of the manufacturing division, **Paul Kaplan** manager of the technical division, and **Albert R. Robbins** manager of the New York laboratories. Mr. Bonow, also assistant vice president of the Stein-Davies Co., came to the company in 1946 from Edgewood Arsenal, Md., as manager of the firm's Long Island City, N. Y., plant. Mr. Kaplan, formerly manager of the development department, will direct the operation of the laboratories and other technical aspects of the firm's operations. Mr. Robbins, with the company since 1951, is now in charge of the Long Island City laboratories.

John H. Schultz, a member of the legal department of Borg-Warner Corp., Chicago, Ill., since 1951, has been elected assistant secretary of the corporation. Prior to joining the firm, Mr. Schultz was a staff attorney in the Tax Court of the United States.

Leonard E. Dupras has been appointed a New England sales representative of the pigments division of American Cyanamid Co., 130 Rockefeller Plaza, New York 20, N. Y. Mr. Dupras joined the company in 1953 in pigment technical service at Bound Brook, N. J., and later was transferred to the sales department of the division.

E. G. Steinmark has been named Philadelphia district sales manager of Pennsylvania Industrial Chemical Corp., Clairton, Pa. He has served with the company as chemist, expediter, and sales executive for the past 6½ years.

E. G. Steinmark

John Sutton, plant engineer at the industrial products division plant of The B. F. Goodrich Co. in Cadillac, Mich., has been named plant engineer of the division's Akron, O., plant 4. Mr. Sutton joined the company in 1927, becoming general foreman in engineering of the Cadillac facility in 1938 and subsequently moving to various locations in the country in similar capacities until returning to the Cadillac, Mich., plant as plant engineer in 1950.

The industrial products division of The B. F. Goodrich Co., Akron, O., has announced the appointment of the following men to positions within the division:

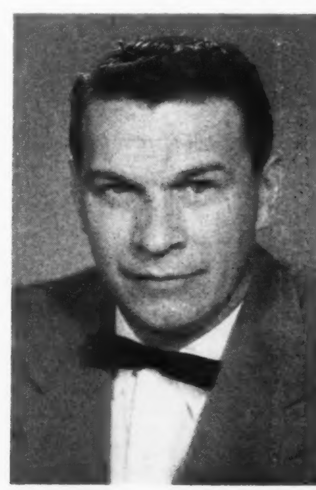
Raymond L. Fitz, formerly processing production manager, as production superintendent of plants 1 and 2. Mr. Fitz joined the company in 1940 as a member of the technical laboratory and rose through the posts of shift foreman, general foreman, production manager of the calendering departments in the processing division, and since 1950, production superintendent in the processing division in charge of rubber preparation, compounding, mixing, milling, and calendering at plants 1 and 4.

Robert E. Baltz as processing production manager, replacing Mr. Fitz. Mr. Baltz, a Goodrich employe since 1929, has held the posts of floor foreman, general foreman, production manager of the miscellaneous departments, and since 1953, project manager of latex thread at plant 4.

Samuel W. Somerville, as divisional time-study and methods manager. He joined the firm in 1936 in the scheduling and production control department, then served in the accounting department. After nearly five years in the Army and Air Force, Mr. Somerville returned to Goodrich in 1946 as an industrial engineer, acting as key industrial engineer from 1947-1951, when he was named manager of the time-study and methods department of the company's Akron industrial products departments.

Eugene J. Mundorf, formerly manager of the time-study and methods department at plant 4, as manager of the time-study and methods department for plants 1 and 2. Mr. Mundorf started with the company as an industrial engineer in 1941 and became manager at plant 4 in 1950.

Karl P. Lipscomb as manager of the time-study and methods department at plant 4, replacing Mr. Mundorf. Mr. Lipscomb joined Goodrich in 1933 as a factory employe, later became a member of the time-study and methods group in 1942.



Raymond L. Fitz

William L. Evers, assistant manager of the Summit, N. J., research laboratories in charge of plastics division research for Celanese Corp. of America, has been promoted to assistant to the technical director of the plastics division of the company, with offices in Newark, N. J. Replacing Dr. Evers as assistant manager is **O. V. Luke,** formerly chief physical chemist of the Clarkwood, Tex., petroleum chemical laboratory.

K. O. William Sandberg has been appointed manager of the newly formed operations research section within the management group of the plastics department, General Electric Co., Pittsfield, Mass. Dr. Sandberg, previously manager of industrial engineering in the chemical division of G-E, will be responsible for the application of techniques such as analysis, projection, and prediction, to business problems.

Gerrit Oldenbrook has been appointed head of the coated fabrics division of The H. M. Sawyer & Son Co., Inc., Cambridge, Mass., succeeding **Paul F. Corbin,** who resigned. Formerly plant manager at the company's Watertown, Mass., plant for the past five years, Mr. Oldenbrook is replaced in that capacity by **Bradford A. Champion.** The new division head joined Sawyer in 1949 after having been associated with the coated fabrics division of Goodall-Sanford, Inc., from 1928-1939, with Tyer Rubber Co. as cost accountant from 1939-1941, and again with Goodall-Sanford from 1941-1949 as plant superintendent.

Curtis Beem, Jr., has been appointed Missouri district sales manager for Minnesota Rubber & Gasket Co., Minneapolis, Minn. Formerly in charge of the company's Houston, Tex., office, Mr. Beem will be responsible for sales in parts of Illinois, Kentucky, and Kansas, as well as all of Missouri.

Richard J. Savage has been named director of sales of the Marco products department of the plastics division, Celanese Corp. of America, New York, N. Y. Mr. Savage was formerly director of product application of the department.

Willis A. Gibbons, associate director of research and development, has retired from the United States Rubber Co. after more than 41 years of service. Dr. Gibbons joined the company directly after receiving his doctorate at Cornell University in 1912. Except for a period with the U. S. Army during World War I, when he was assistant military attaché to the American Embassy, London, England, and later, captain in the Ordnance Department in Washington, his entire business career was spent with the rubber company. Dr. Gibbons was a pioneer in the company's scientific research and development and his major contributions include latex dipping of tire cord, the T-50 test for measuring rubber vulcanization, new methods of vulcanization, and the manufacture of rubber thread and other products direct from latex. He holds more than 60 patents in the field of rubber technology. He was director of research for the company from 1928 until 1946 and has been associate director since 1946. During World War II, Dr. Gibbons was a member of the technical committee of the Office of Rubber Reserve, Reconstruction Finance Corp., and was a member of the four-man American Rubber

Pach Bros.

W. A. Gibbons

Mission sent to the Soviet Union to study its synthetic rubber processes. He has served on various advisory committees of the National Research Council and at present is chairman of the Division of Engineering & Industrial Research of the Council.

FINANCIAL

American Cyanamid Co., New York, N. Y., and subsidiaries. Year ended December 31, 1953: net earnings, $27,234,250, equal to $3.15 each on 8,646,261 common shares, compared with $26,226,020, or $3.07 each on 8,537,979 shares, the year before; net sales, $380,393,340, against $368,408,345; income and excess profits taxes, $25,000,000, against $25,800,000.

March quarter, 1954: net earings, $7,155-580, equal to 83¢ each on 8,666,894 shares, compared with $10,553,909, or $1.22 each on 8,594,179 shares, a year earlier; net sales, $98,205,113, against $102,832,189.

American Hard Rubber Co., New York, N. Y., and subsidiary. For 1953: net earnings, $102,474, equal to $3.19 each on 32,168 preferred shares, compared with $237,783, or 45¢ each on 273,609 common shares, in 1952; net sales, $17,119,796, against $18,677,322; federal incomes taxes, $99,000, against $240,000.

American Zinc, Lead & Smelting Co., Columbus, O. Year ended March 31, 1954: net income, $1,429,953, equal to $1.62 a share, compared with $2,154,741, or $2.70 a share, in last year's quarter.

Belden Mfg. Co., Chicago, Ill. For 1953: net income, $1,386,952, equal to $4.33 a common share, compared with $975,799, or $3.04 a share, in 1952.

Carborundum Co., Niagara Falls, N. Y. Three months ended March 31, 1954: net income, $756,332, equal to 44¢ a share, contrasted with $1,865,173, or $1.21 a share, in the like period last year.

Anaconda Wire & Cable Co., New York, N. Y. For the year 1953: net profit, $6,015,386, equal to $7.13 a share, against $6,275,922, or $7.44 a share, in 1952.

March quarter, 1954: net income, $1,-256,853, equal to $1.49 a common share, against $1,921,922, or $1.28 a share, in the 1953 quarter.

Blaw-Knox Co., Pittsburgh, Pa. Year ended December 31, 1953: net profit, $4,-138,000, equal to $2.93 a common share, against $4,189,000, or $2.97 a share, the year before; sales, $120,591,000, against $100,478,000; federal income taxes and renegotiation, $11,730,000, against $7,407,000.

First quarter, 1954: net profit, $1,142,-037, equal to 75¢ a share, against $1,028,-303, or 68¢ a share, a year earlier.

Sidney Blumenthal & Co., Inc., New York, N. Y. First quarter, 1954: net loss, $252,537, contrasted with net profit of $44,157, equal to 12¢ a common share, in the same quarter last year.

Borg-Warner Corp., Chicago, Ill., and subsidiaries. Twelve months to December 31, 1953: net earnings, $23,978,142, equal to $9.77 each on 2,396,686 common shares, compared with $22,914,657, or $9.33 each on 2,394,879 shares, in the preceding 12 months; net sales, $407,379,056, against $353,948,112; federal and Canadian income taxes and excess profits taxes, $23,650,000, against $37,125,000.

First three months, 1954: net earnings, $5,001,506, equal to $2.03 a share, against $6,340,112, or $2.59 a share, a year earlier; net sales, $97,807,117, against $113,944,423.

Boston Woven Hose & Rubber Co., Cambridge, Mass. Quarter ended November 30, 1953: net loss, $93,910, contrasted with net profit of $45,123, equal to 10¢ a common share, a year earlier.

Brunswick-Balke-Collender Co., Chicago, Ill. March quarter, 1954: net loss, $589,076, against a loss of $391,498 in the first quarter of 1953.

Canada Wire & Cable Co., Leaside, Ont. For 1953: net profit, $2,088,294, equal to $10.17 a Class B share, against $1,994,062, or $9.72 a share, the year before.

Philip Carey Mfg. Co., Cincinnati, O. First quarter, 1954: net earnings, $235,-255, equal to 27¢ a share, compared with $337,483, or 40¢ a share, in last year's quarter.

Circle Wire & Cable Corp., Maspeth, L. I., N. Y. For 1953: net income, $1,814,-823, equal to $2.42 a common share, compared with $2,293,444, or $3.05 a share, in 1952.

First quarter, 1954: net earnings, $374,-187, equal to 50¢ a share, compared with $667,567, or 89¢ a share, in the 1953 months.

Cooper Tire & Rubber Co., Findlay, O. For 1953: net earnings, $359,285, equal to $2.29 a common share, against $322,131, or $2.05 a share, in the previous year.

First quarter, 1954: net earnings, $70,-592, equal to 45¢ a share, contrasted with $228,832, or $1.46 a share, a year earlier.

Collins & Aikman Corp., New York, N. Y. Year ended February 27, 1954: net loss, $1,208,933, contrasted with net profit of $1,085,791 in the preceding fiscal year.

Columbian Carbon Co., New York, N. Y. First three months, 1954: net profit, $1,289,583, equal to 80¢ a share, against $1,295,559, or 80¢ a share, in the like period last year.

Crown Cork & Seal Co., Inc., Baltimore, Md. First three months, 1954: net income, $474,230, equal to 28¢ a common share, contrasted with net loss of $22,290 in the like period last year.

Dayton Rubber Co., Dayton, O. Quarter ended January 31, 1954: net income, $118,559, equal to 16¢ a common share, contrasted with $455,657, or 74¢ a share, in the corresponding period last year.

Detroit Gasket & Mfg. Co., Detroit, Mich. For 1953: net income, $1,195,420, equal to $2.28 a share, against $997,452, or $1.90 a share, the year before.

DeVilbiss Co., Toledo O. First three months, 1954: net profit, $132,068, equal to 44¢ a common share, compared with $246,297, or 82¢ a share, in the 1953 period.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. First three months, 1954: net earnings, $73,793,248, equal to $1.56 a common share, against $56,721,-002, or $1.19 a share, in last year's months.

General Cable Corp., New York, N. Y. March quarter, 1954: net income, $1,280,-663, equal to 58¢ a share, compared with $1,405,821, or 64¢ a share, in the 1953 quarter.

General Electric Co., Schenectady, N. Y. First quarter, 1954; consolidated net profit, $48,029,000 equal to $1.67 a share, compared with $33,849,000, or $1.17 a share, in last year's quarter; net sales, $715,596,000, against $777,819,000.

General Motors Corp., Detroit, Mich. Three months ended March 31, 1954: net earnings, $189,167,333, equal to $2.13 a common share, against $151,261,876, or $1.70 a share, a year earlier.

The B. F. Goodrich Co., Akron, O. March quarter, 1954: consolidated net income, $8,556,458, equal to $2.04 each on 4,198,582 common shares, against $8,105,-712, or $1.94 each on 4,170,425 shares, a year earlier; consolidated net sales, $152,-023,569, against $171,175,551.

Byron Jackson Co., Los Angeles, Calif. First quarter, 1954: net income, $448,768, equal to 85¢ a common share, against $277,-689, or 52¢ a share, in the like period last year.

Monroe Auto Equipment Co., Monroe, Mich. Nine months ended March 31, 1954: net earnings, $14,184, contrasted with $357,544 a year earlier.

CALENDAR

June	18.	Akron Rubber Group. Outing.
		Boston Rubber Group. Summer Outing. Andover County Club, Andover, Mass.
June	20-24.	American Society of Mechanical Engineers. Pittsburgh, Pa.
June	21-25.	International Rubber Technology Conference. London, England.
June	23.	Rubber Division, C.I.C. Royal York Hotel, Toronto, Ont., Canada.
June	25.	Detroit Rubber & Plastics Group, Inc. Summer Outing.
July	13-15.	Plant Maintenance Show. Pan Pacific Auditorium. Los Angeles, Calif.
Aug.	3.	New York Rubber Group. Golf Tournament. Baltusrol Golf Club, Springfield, N. J.
Aug.	20.	Philadelphia Rubber Group. Annual Outing. Cedarbrook Country Club, Mount Airy, Philadelphia 19, Pa.
Sept.	9.	Miami Valley Section, SPE. Annual Fall Outing. N.C.R. Old River Park, Dayton, O.
Sept.	11-13.	Division of Rubber Chemistry, A. C. S. Hotel Commodore, New York, N. Y.
Sept.	23.	Southern Ohio Rubber Group. Fall Technical Meeting.
Oct.	5.	The Los Angeles Rubber Group, Inc. Hotel Statler, Los Angeles, Calif.
		Buffalo Rubber Group. Westbrook Hotel, Buffalo, N. Y.
Oct.	7.	Miami Valley Section, SPE.
Oct.	8.	Detroit Rubber & Plastics Group, Inc. Detroit Leland Hotel, Detroit, Mich.
Oct.	13.	Newark Section, SPE. Military Park Hotel, Newark, N. J.
Oct.	14.	Northern California Rubber Group.
Oct.	15.	Boston Rubber Group.
Oct.	20.	New York Section, SPE. Hotel Gotham, New York, N. Y.
		Washington Rubber Group.
Oct.	22.	New York Rubber Group. Henry Hudson Hotel, New York, N. Y.
Nov.	3.	The Los Angeles Rubber Group, Inc. Hotel Statler, Los Angeles, Calif.
Nov.	10.	New York Section and Newark Section, SPE. Joint Meeting. Hotel Gotham, New York, N. Y.
Nov.	11.	Northern California Rubber Group.
		Miami Valley Section, SPE.
Nov.	17.	Washington Rubber Group.
Nov.	18.	Rhode Island Rubber Club.
Dec.	4.	Miami Valley Section, SPE. Christmas Party. Hartwell Country Club.
Dec.	8.	Buffalo Rubber Group. Christmas Party. Buffalo Trap & Field Club, Williamsville, N. Y.
Dec.	9.	Northern California Rubber Group.
Dec.	10.	Detroit Rubber & Plastics Group, Inc. Christmas Party. Sheraton Cadillac Hotel, Detroit, Mich.
		New York Rubber Group. Christmas Party. Henry Hudson Hotel, New York, N. Y.
		Boston Rubber Group. Christmas Party.
Dec.	18.	Southern Ohio Rubber Group. Christmas Party.

Gooodyear Tire & Rubber Co., Akron, O. First quarter, 1954: net earnings, $12,470,584, equal to $2.60 a share, against $11,284,774, or $2.34 a share, in the 1953 quarter; net sales, $273,322,247, against $303,552,336.

Hewitt-Robins, Inc., Stamford, Conn. January 1-March 31, 1954: net earnings, $207,725, equal to 72¢ each on 287,051 common shares against $244,313, or 85¢ each on 286,051 shares, in the 1953 period; net sales, $8,877,563, against $9,325,789.

Johns-Manville Corp., New York, N. Y. First three months, 1954: net earnings, $2,592,406, equal to 82¢ a common share, contrasted with $4,943,491, or $1.56 a share, in the like period last year.

Johnson & Johnson, New Brunswick, N. J. First three months, 1954: net income, $2,922,000, equal to $1.38 a share, against $2,791,000, or $1.32 a share, in the corresponding months last year.

Kendall Co., Walpole, Mass. Twelve weeks ended March 31, 1954: net profit, $824,000, equal to 78¢ a share, compared with $1,276,000, or $1.23 a share, in the corresponding weeks last year.

Mathieson Chemical Corp., Baltimore, Md. March quarter, 1954: net profit, $4,-753,819, equal to 83¢ a share, against $4,668,645, or 82¢ a share, in the 1953 period.

Minnesota Mining & Mfg. Co., St. Paul, Minn., and domestic and Canadian subsidiaries. First quarter, 1954: net income, $5,259,281, equal to 64¢ each on 8,218,985 common shares, compared with $4,256,859, or 53¢ each on 8,025,856 shares, in the 1953 quarter; net sales, $54,088,789, against $51,062,122.

National Lead Co., New York, N. Y. January 1-March 31, 1954: net profit, $8,067,827, equal to 67¢ a share, against $6,202,049, or 54¢ a share, in the 1953 period.

National Rubber Machinery Co., Akron, O. Quarter ended March 31, 1954: net income, $204,812, equal to $1.05 a share.

Okonite Co., Passaic, N. J. January 1-March 31, 1954: net earnings, $351,279, equal to $2.08 a share, contrasted with $714,216, or $4.49 a share in the 1953 months.

Parke, Davis & Co., Detroit, Mich. First three months, 1954: net profit, $2,-002,996, equal to 41¢ a share, against $2,-209,957, or 45¢ a share, in the 1953 quarter.

Phelps Dodge Corp., New York, N. Y. March quarter, 1954: net income, $10,-016,347, equal to 99¢ a share, against $9,716,905, or 96¢ a share, a year earlier.

Sheller Mfg. Corp., Portland, Ind. First quarter, 1954: net income, $676,860, equal to 71¢ a share, against $896,084, or 94¢ a share, a year earlier.

Glidden Co., Baltimore, Md. Six months to April 30, 1954: net earnings, $2,902,830, equal to $1.27 a common share, against $3,112,926, or $1.36 a share, a year earlier.

Lee Rubber & Tire Corp., Conshohocken, Pa. Six months to April 30, 1954; net profit, $633,710, equal to $2.28 a common share, against $815,808, or $2.93 a share, in the like period last year.

Phillips Petroleum Co., Bartlesville, Okla., and subsidiaries. First quarter, 1954: net income, $19,162,400, equal to $1.31 each on 14,625,754 shares outstanding, against $17,755,565, or $1.22 each on 14,583,022 shares in the 1953 period.

Pittsburgh Coke & Chemical Co., Pittsburgh, Pa., and subsidiaries. Three months ended March 31, 1954: net profit, $32,000, equal to $1.03 each on 30,942 $5 preferred shares, contrasted with $783,000, or 75¢ each on 900,000 common shares, a year earlier; net sales, $7,894,000, against $13,136,000.

Pittsburgh Plate Glass Co., Pittsburgh, Pa. March quarter, 1954: net profit, $7,179,978, equal to 79¢ a common share, compared with $9,571,034, or $1.06 a share, a year earlier.

Raybestos-Manhattan, Inc., Passaic, N. J., and domestic subsidiaries. March quarter, 1954: net earnings, $786,412, equal to $1.25 each on 628,100 capital shares, compared with $925,442, or $1.47 a share, in the 1953 period.

Rome Cable Corp., Rome, N. Y. Year ended March 31, 1954: net income, $1,637,787, equal to $3.27 a common share, compared with $2,008,321, or $4.01 a share, in the preceding fiscal year.

St. Joseph Lead Co., New York, N. Y. January 1-March 31, 1954: net income, $1,099,377, equal to 40¢ a common share, compared with $2,009,118, or 74¢ a share, a year earlier.

Seiberling Rubber Co., Akron, O. First quarter, 1954: net loss, $50,907, contrasted with net profit of $179,280, equal to 33¢ a common share, in the first quarter last year; net sales, $7,550,384, against $9,407,127.

Skelly Oil Co., Kansas City, Mo. January 1-March 31, 1954: net income, $7,165,481, equal to $1.24 a common share, against $7,245,187, or $1.26 a share in the same months last year.

Stauffer Chemical Co., New York, N. Y. First quarter, 1954: net income, $1,124,000, equal to 48¢ each on 2,350,240 capital shares, against $1,085,000, or 53¢ each on 2,040,240 shares, in the 1953 quarter; sales, $18,076,000, against $17,461,000.

Union Carbide & Carbon Corp., New York, N. Y. First three months, 1954: net income, $21,443,770, equal to 74¢ each on 28,952,794 capital shares, against $25,695,100, or 89¢ each on 28,806,344 shares, in last year's period; net sales, $220,990,171, against $260,696,104.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Armstrong Cork Co.	Com.	$0.75 q.	June 1	May 7
	$1.75 Pfd.	0.93¾ q.	June 15	May 7
	$4.00 Pfd.	1.00 q.	June 15	May 7
Armstrong Rubber Co.	Cl. A & B Com.	0.50 q.	July 1	June 16
	4¾% Pfd.	0.59⅜ q.	July 1	June 16
Belden Mfg. Co.	Com.	0.40 q.	June 1	May 17
Brown Rubber Co.	Com.	0.25 q.	June 1	May 18
Brunswick-Balke-Collender Co.	Pfd.	1.25 q.	July 1	June 21
Carborundum Co.	Com.	0.35 q.	June 10	May 21
Crown Cork International Corp.	$1.00 Cl. A	0.25 q.	July 1	June 10
Dunlop Rubber Co., Ltd	Com.	12% final	July 13	May 17
		2% extra	July 13	May 17
E. I. du Pont de Nemours & Co., Inc.	Com.	$1.00 q.	June 14	May 24
	$4.50 Pfd.	1.12½ q.	July 24	July 9
	$3.50 Pfd.	0.87½ q.	July 24	July 9
Faultless Rubber Co.	Com.	0.25 q.	June 25	June 15
		0.15 extra	June 25	June 15
Firestone Tire & Rubber Co.	4½% Pfd.	1.12½ q.	June 1	May 14
Flintkote Co.	Com.	0.50 q.	June 10	May 27
	$4.00 Pfd.	1.00 q.	June 15	June 1
General Electric Co.	Com.	0.40 new	Aug. 2	June 25
General Motors Corp.	Com.	1.00 q.	June 10	May 13
	$5.00 Pfd.	1.25 q.	Aug. 2	July 6
	$3.75 Pfd.	0.93¾ q.	Aug. 2	July 6
The General Tire & Rubber Co.	Com.	0.50 q.	May 31	May 21
The B. F. Goodrich Co.	Com.	0.80 q.	June 30	June 8
Hewitt-Robins, Inc.	Com.	0.50 q.	June 15	June 2
Johns Manville Corp.	Com.	0.75	June 10	June 1
Johnson & Johnson	Com.	0.35 q.	June 11	May 26
I. B. Kleinert Rubber Co.	Com.	0.25	June 11	May 28
Midwest Rubber Reclaiming Co.	Com.	0.25 q.	July 1	June 8
	Pfd.	0.56¼ q.	July 1	June 8
Minnesota Mining & Mfg. Co.	Com.	0.30 q.	June 12	May 21
	Pfd.	1.00 q.	June 12	May 21
Parker Appliance Co.	Com.	0.25	June 21	June 7
Phelps Dodge Corp.	Com.	0.65 q.	June 10	May 21
Raybestos-Manhattan, Inc.	Com.	0.50	June 12	May 28
Rome Cable Corp.	Com.	0.35 q.	July 1	June 10
Seiberling Rubber Co.	Com.	0.10	June 18	June 3
	4½% Pfd.	1.12 q.	July 1	June 15
	5% Pfd.	1.25 q.	July 1	June 15
A. G. Spalding & Bros., Inc.	Com.	0.25 q.	June 15	June 8
Thermoid Co.	Com.	0.10 q.	June 30	June 10
United Electric Corp.	Com.	0.60 q.	June 10	May 18
United States Rubber Co.	Com.	0.50 q.	June 12	May 24
	8% 1st Pfd.	2.00 q.	June 12	May 24
Westinghouse Air Brake Co.	Com.	0.40 q.	June 15	May 28

U. S. Rubber Reclaiming Co., Inc., Buffalo, N. Y. First quarter, 1954: net loss, $57,232, contrasted with net profit of $76,874, in last year's quarter.

Union Asbestos & Rubber Co., Chicago, Ill. First three months, 1954: net earnings, $107,339, equal to 23¢ each on 475,176 capital shares, compared with $69,961, or 15¢ a share, in the 1953 period; net sales, $3,139,184, against $2,810,588.

United Carbon Co., Charleston, W. Va. Initial quarter, 1954: net earnings, $1,029,681, equal to $1.29 a share, against $1,005,908, or $1.26 a share, in the corresponding quarter of 1953.

United States Rubber Co., New York, N. Y. First three months, 1954: net profit, $7,545,109, equal to $1.18 a common share, compared with $7,156,608, or $1.10 a share, a year earlier; net sales, $190,103,720, against $226,933,883.

Westinghouse Air Brake Co., Wilmerding, Pa. Three months ended March 31, 1954: net earnings, $922,000, equal to 22¢ a share, compared with $2,188,000, or 53¢ a share, in the 1953 quarter; net sales, $31,000,000, against $27,926,000.

Unicellular Formulations

(Continued from page 373)

Either open or closed molds can be used for both types of formulations. The open-air cell type, when poured into the mold, is first expanded to a predetermined height by controlled heating and then fused by applying a higher temperature. The resulting product has the properties of great tensile strength and resiliency and excellent recovery characteristics, according to the company.

The "Closell" formulations do not require high temperatures, it is claimed, and the final product, containing millions of independent, nitrogen-filled sealed cells, is resistant to penetration by air, water, and dust.

Both types possess qualities representative of polyvinyl chloride, with specific properties similar to those of foamed vinyl manufactured by other methods.

SPI Award to Junior Achievement Co.

THE annual award of the Society of the Plastics Industry to the Junior Achievement Co. producing the best plastic product has been awarded this year to Teen-Plastics Co., Springfield, Mass. This company manufactured and sold molded plastic coasters under the sponsorship of Monsanto Chemical Co., of that city.

Teen-Plastics, composed of 15 Springfield high school students including five girls, was judged the best of 35 such J. A. plastic companies competing in the finals of the contest. It was organized last fall, like 1,800 other such companies, under the J. A. program. Operated and managed by teen-agers, these companies are intended to teach young people about business by having them run a small-scale enterprise of their own.

NEWS FROM ABROAD

MALAYA

Cake Points Way for Natural Rubber

"The natural rubber industry is now at the cross-roads—one road leading to progress and a place in the sun and the other to eventual oblivion," W. E. Cake, president and managing director of Malayan American Plantations, Ltd. (United States Rubber Co. subsidiary), declared in concluding an item in the *Straits Times* on how natural rubber is to meet synthetic competition and avoid the fate of the camphor, quinine, and indigo industries, which succumbed to their synthetic rivals.

He brought out that extensive replanting is needed not only to reduce costs, but to make more natural rubber available and so prevent future loss of ground to synthetic rubber in the event of a shortage, for he is of those who foresee a shortage of rubber before long. Turning to consumption research, Mr. Cake sees an immense field opened up by treating natural rubber as a raw material to be modified chemically to produce substances with specific desired properties. He would have a research program, with this in view, developed in close cooperation with the scientists and technologists of the big consumers in the United States, United Kingdom, France, and other countries. Expenses would have to be carefully gone over to insure that available funds were used to the best advantage, and if they then proved insufficient, additional finances would have to be found.

Mr. Cake is but one of a number of leading rubber men who are continually hammering away at the need of replanting and quality research.

It has been shown that out of the total estate acreage of 1,996,727 acres in Malaya, not more than about 360,000 acres have been replanted since the end of the war, bringing the total estate area now planted with high-yielding trees to 673,774 acres. This acreage is distributed among 1,133 estates, that is, less than half the total of 2,383 estates. Under present circumstances, when natural rubber is fighting for its existence, this position is held to be unsatisfactory; hence the insistence on the need of immediate widespread replanting, even with low price levels.

More funds have been asked for quality research, but though many rubber growers appreciate the need, the majority has so far been reluctant to undertake additional expense for the purpose.

Rubber Growers Less Pessimistic

The recent recovery in rubber prices, continuing as it did for some weeks, brought a greater feeling of optimism than has been evident here for some time. Rubber growers are more confident since it has become apparent that various countries, especially West Germany and Japan, are showing more interest in natural rubber, and the United States has been regularly increasing the proportion of natural rubber used.

The lifting of controls on the amounts of rubber that may be exported to the Soviet block in Europe has also contributed to raising spirits, despite the realization that not much more than a psychological effect could be expected from the measure, seeing that Russia does not buy much rubber from Malaya.

A more hopeful development is the growing demand for latex for foamed articles, production of which is expanding rapidly in many countries in different parts of the world, especially among those having adequate storage facilities. Accordingly, rumors regarding plans for the erection of installations for discharging and storing bulk latex in Hamburg may be taken to point to increasing latex consumption in West Germany and to a further outlet for direct latex shipments from the Far East, with Malaya undoubtedly also obtaining a share of the increased business.

Classified Rubber Progressing Too Slowly

Although total Far Eastern production of Technically Classified Rubber has now passed the million-bale mark, I. G. Salmond, chairman of the Singapore Chamber of Commerce Rubber Association, is not satisfied with the present rate of expansion. The progress of T. C. rubber, he finds, is being hampered by marketing and production difficulties which seem to react on each other to produce a vicious circle. Most consumers apparently like T. C. rubber, but are not enthusiastic about paying the premium for it, mainly because they are not yet able to get it regularly in sufficiently large quantities. On the other hand, the difficulty of collecting the premium slows down larger-scale production. Consequently Salmond felt that dealers should give all aid possible in promoting T. C. rubber.

The International Rubber Study Group has issued figures showing that the total amount of T. C. rubber produced in the Far East in 1953 was almost double that of 1952. Malaya in both years was responsible for more than half the total output, as the following table shows:

	1952	1953
Malaya	17,102	27,837
Viet-Nam and Cambodia	7,443	14,671
Indonesia	50	5,752
Total (long tons)	24,595	48,260

Hard Times for Remillers

The rubber remilling industry in Singapore has felt the pinch of the times as much probably as any other section of the Malayan rubber industry. The prosperity of the remillers depends largely on the supplies of poorly prepared smallholder rubber from Indonesia which they process and make fit for sale on the world market. Largely because of restrictive Indonesian export and currency regulations, these imports have dropped from 470,648 tons in 1951 to 293,328 tons in 1952 and 247,260 tons in 1953. As a result, there has been less rubber for the 12 remilling factories in Singapore to handle and, as the Singapore Chamber of Commerce Rubber Association recently revealed, four of the 12 were closed. Employment, which included 4,500 persons when the industry was at its peak, is now down to 1,750 workers. The maximum potential capacity of the factories per month is put at 26,000 tons wet weight and 18,000 tons dry weight, but at present output is less than half those figures.

Early Maturing *Hevea*

An improved method of cultivating young rubber advocated by a local planter and claimed to bring rubber trees to the bearing stage one year sooner than normal is arousing much interest here as promising a means of strengthening the competitive position of natural rubber with synthetic. According to published details, the recommended technique is not essentially new, but represents a combination of the best methods of treatment known. It particularly stresses careful attention to root growth, suitable manuring, and closest supervision. Young plants are to be left in the nurseries for a longer period than is customary; larger planting baskets are to be used, and ample decaying organic matter provided for the roots to feed on. During the first 18 months all competing vegetation is to be removed from the area occupied by the roots.

Local Trade News

The lower price of rubber has stimulated sales of Revertex and Revultex types of concentrated latex made by Revertex, Ltd., in Malaya and Ceylon to the extent that the capacity of the factory at Kluang has to be raised to handle larger supplies of latex.

Excessive talcum in bales of ribbed smoked sheet has cost five packers in Singapore a total of $15,200 (Straits currency) in fines imposed by the Malayan Rubber Export Registration Board. According to the packaging specifications of the Singapore Chamber of Commerce Rubber Association, approved by local rubber trade associations and adopted by the Board, the use of talcum inside bales of Ribbed Smoked Sheet No. 1 and No. 2 is prohibited except as a light dusting before the wrapper sheets are applied. Talcum powder must not appear in any other part of the bale. For Nos. 3, 4, and 5 RSS, no talcum powder may be used in any part of the bale.

The Board announced the completion of lists of registered packers and shippers, and these are now being issued to all interested parties.

A general shortage of both natural and synthetic rubber is foreseen by C. E. Hudson, general manager of the Dunlop Rubber Purchasing Co. Mr. Hudson, who is resigning his position with Dnulop, felt that prices would rise steeply when synthetic factories were turned over to private enterprise, that there would be an increasing demand all around, and that it was essential for rubber estates to replant with high-yielding stock to meet the coming situation.

The Federation of Rubber Trade Associations in its annual report discussed the position of large numbers of Chinese rubber packers and shippers who, because they are not represented by agents in the United States, are at the mercy of unscrupulous

buyers. Consequently the Association, in conjunction with other organizations in Singapore, is taking steps to establish Malayan agents in the United States to represent the interest of all packers and shippers as a whole.

INDONESIA

Rubber Output Down; Estates Plagued by Squatters

Total outputs of rubber in Indonesia came to 702,409 tons in 1953, against 745,652 tons in 1952; estates accounted for 299,846 tons, against 289,626 tons in 1952, and smallholders for 402,563 tons, against 456,026 tons. The decrease in 1953 was thus wholly due to lower smallholder output, which, as Indonesian sources have it, declined most in Borneo. Total exports for the year came to 686,211 tons, against 749,073 tons in 1952.

Incentive regulations introduced by the government to encourage Indonesian rubber growers last October are showing results in bringing out more native rubber, if one is to judge by the considerably higher export figures for December.

Though statistics show increased production on estates, the conditions for foreign enterprises in Indonesia are far from satisfactory. There are constant reports of rubber stealing; villagers invade estates to cut down *Hevea* trees for firewood, and squatting continues on a disturbing scale, especially in the remoter areas where squatters form a serious threat to regular exploitation. The influx of persons unconnected with the estates not only increases insecurity, but undermines authority, to say nothing of the reckless damage to trees and soil caused by squatters.

Legislation has so far proved sadly inadequate and in many cases seems to have produced the reverse of the effect aimed at. Evidently basing themselves on their version of the saying, "Possession is nine-tenths of the law," squatters have extended their activities, seemingly determined to make their eventual evacuation as troublesome as possible, if not impossible. It is felt by many that without a satisfactory solution of squatting, the future of the estates is threatened. Several estates have already given up in the constant struggle and have either disappeared or sold out; in some cases they have leased to Indonesians.

Outbreaks of terrorism further add to the existing difficulties. If in spite of these adverse conditions estate output could be increased in 1953, this increase seems to have been largely the result of efficient management and increasing yields from high-grade trees.

JAPAN

A seven-man rubber mission, headed by Ryohei Kurata, president of Nikka Rubber Co., of Tokyo, arrived in Singapore last February to study present standards of rubber grading and marketing. The Japanese, it seems, would like to buy more rubber from Malaya if they could be assured of obtaining good quality at a fair price. When they made their first large postwar rubber purchases from Malaya last year, they had some rather unfortunate experiences with shipments which gave cause for frequent complaints as to short weight, improper grading, and the use of excessive amounts of talcum to mask defects. Following an investigation of the complaints, there was a marked improvement in shipments, but the Japanese apparently want to be sure of the right kind of cooperation before deciding on bigger commitments.

Another problem they must take into consideration is the shortage of sterling funds which early this year led the Japanese Government to suspend free imports of Malayan rubber, and importers became obliged to apply for allocations of import rubber. For some months preceding this step, Japan had been turning from Indonesia to Malaya for increasing quantities of rubber, primarily because of the higher price in Indonesia due to an agreement whereby Japan must pay the former in gold dollars.

Incidentally, it seems to have been suggested on the occasion of the visit of the rubber mission that the amount of rubber Japanese would take from Malaya would depend on the amount of Japanese manufactured goods Malaya bought.

According to figures published by the Finance Ministry Customs Department, Japan imported the record total of 91,021 tons of rubber in 1953, 24,000 tons over 1952 imports. Malaya supplied about 53% of this total; while Indonesia furnished about 47%.

GREAT BRITAIN

Three Companies to Produce Synthetic Rubber

Although certain leaders of the British rubber manufacturing industry from time to time in the last few years have openly advocated the establishment of a British synthetic rubber industry, no definite steps seemed to have been taken in this matter. Now, however, three important concerns have announced, almost simultaneously, concrete plans for starting synthetic rubber plants. These concerns are Dunlop Rubber Co., Ltd., Imperial Chemical Industries, Ltd., and Monsanto Chemicals, Ltd.

Dunlop has actually already been running a pilot plant for some years and now will build a full-scale plant, to cost £500,000 (about $1,400,000) at Fort Dunlop, where new synthetic rubber types are to be produced and tried out in the manufacture of tires and certain other items. Initial output is to be around 2,000 tons annually, and production is scheduled to commence in 1956.

The plans of the Imperial Chemical Industries aim at the first large-scale production in the United Kingdom of rubber-like polymers based on butadiene and include a plant with capacity of 10,000 tons a year, to be erected at Wilton, North Yorkshire, and expected to be in operation in 1955. Butadiene from the I. C. I.'s oil-cracking plant at Wilton will be used in manufacturing acrylonitrile and styrene copolymers ranging from oil-resistant Perbunan types to hard, reinforcing resins. A pilot plant is to begin working this year.

Monsanto Chemicals recently completed its pilot plant, which will soon make available styrene-butadiene rubber-like resins, primarily for use in the manufacture of shoe soles and emulsion paints. This firm is to build a large-scale plant to cost £500,000 which, it is hoped, will start production in 1956, with an initial output of 4,000 tons per annum. Styrene for the purposes envisaged will be supplied by Forth Chemicals, Ltd., which will expand its styrene monomer plant at Grangemouth, Scotland, so as to double its present capacity. This company, it may be recalled, was formed in 1950 by Monsanto Chemicals, Ltd., and British Petroleum Chemicals, Ltd., the latter owned by Anglo-Iranian Oil Co., Ltd., and Distillers Co., Ltd.

The news of these three ventures, coming in the same week, has understandably caused uneasiness among natural rubber growers, already faced with the problems involved in carrying on at prevailing low prices, and they seem inclined to be skeptical about the assurances that the output of the new synthetic rubber plants will be limited to specialties not competitive with natural rubber; they apparently foresee that success in a limited field will only sharpen the appetite for wider conquests.

Dunlop officials, it may be added, were quick to state that the company's synthetic rubber project will not affect interest in its rubber plantations in Malaya, where, in fact, an intensive program of research is now in progress.

Government Will Not Subsidize Synthetic

One consolation rubber growers have, the assurance by Oliver Lyttleton, Secretary of State for the Colonies, that the government will not subsidize a British synthetic rubber industry. The Colonial Secretary made this point clear at the first dinner of the Federation of British Rubber Manufacturers' Associations, held in London on March 24. On that occasion the Federation's president, P. W. Howard, in his speech urged the need of Government sponsorship of a competitive synthetic rubber industry in Britain, specifically for the production of GR-S rubbers.

Mr. Lyttleton replied that he would be glad to see an industry established here for special types of synthetic rubber, but that the establishment of a large synthetic rubber industry under government sponsorship was quite another matter and should only be considered in the background of Britain's imperial interests and imperial obligations to countries like Malaya.

"We used to complain," he added, "of the subsidization of synthetic rubber in the United States, and it would indeed be paradoxical if we ever incurred the same criticism inside our own country."

Fixing Responsibility for the Plight of NR

Less than two weeks before the plans for synthetic rubber factories in Britain were made public, *The India Rubber Journal*,[1] commenting editorially on the decreased absorption of natural rubber in 1953 by Communist countries—which has been laid to a growing synthetic rubber industry behind the Iron Curtain—blames inter-government interference for the present plight of natural rubber:

[1] Mar. 13, 1954.

"When rubber was first declared to be a 'strategic war material,' it was obvious that it would lead countries deprived or uncertain of supplies to foster synthetic rubber production," it said and went on: "Now a rise of a synthetic industry was predictable at least by the opening of this century. Without government stimulation, subsidies, and protection, however, its development was likely to have been a slow process. Its growth within two or three decades to proportions which make it a deadly rival of NR, stems primarily from the latter's misfortune in being willy nilly, made a shuttlecock of politicians. For initiating the succession of events that created NR's powerful competitors . . . our own and Allied Governments are responsible."

Notes

The Rubber Growers' Association held its ordinary general meeting in London on March 30, when K. M. G. Anderson, J. P., was elected chairman and J. W. Calver, vice chairman, for the ensuing year. Mr. Anderson is a director of Guthrie & Co., Ltd., with which he has been connected since 1936; he is also chairman and/or director of various rubber plantation companies and a director of the London Rubber Exchange. Mr. Calver is a director of numerous rubber and tea plantation companies operating in the Far East and also in Africa. He controls William E. Calver & Co., Ltd., which has interests chiefly in North Africa.

The Board of Trade is considering an application for higher protective duty on sheets or sheeting of polyvinyl chloride resins or copolymers, not backed with a textile material.

Aberdare Cables has reportedly signed a contract to supply a "substantial quantity" of British high-tension cable to Russia.

Redfern's Rubber Works, Ltd., reports improved turnover and record direct exports during 1953. The company intends to spend about £150,000 in the next three years on extensions to buildings and additional and replacement plant. Rubberlines (Hyde) Ltd., a recently formed subsidiary, showed first-year results warranting expansion to treble productive capacity.

David Moseley & Sons, Ltd., has begun to put into effect a program for increasing production, and new buildings erected are expected to be completed and operating in the current year. Further progress is reported in output of fire-resisting conveyor belting, and considerable increase in sales of waterproof fabrics has been announced.

GERMANY

Dechema Activities

The Dechema, German Association for Chemical Apparatus, has published the first part of the third edition of the "Dechema Tables of Materials," by E. Rabald and H. Bretschneider, which includes 100 sheets covering the subjects, abietic acid to ammonium sulfide.

In this new enlarged edition each chemical agent is given a separate, loose sheet on which is recorded its chemical reaction, with some 90 different materials used in the manufacture of chemical apparatus and equipment. On the reverse side of the table are notes giving brief particulars on special results and experience in actual practice. The second part in this series is to follow shortly.

A large number of German and foreign personalities met in Karlsruhe, October 1, on the invitation of the Dechema, to celebrate the twenty-fifth year of the Institute for Apparatus Building & Procedure Technique of the Technological University of Karlsruhe and to honor Prof. E. Kirschbaum, its creator. The Institute, the first of its kind anywhere, was started in 1928 by the then-young Dr. Kirschbaum with the support of the Association of German Apparatus-Building Establishments and has been under his direction ever since. Several Kirschbaum-scholars presented papers, including one of more particular interest to the rubber industry, "Problems of Chemical Apparatus Construction in the Erection of the German Buna Works," by E. Mach, Ludwigshafen.

On the occasion of the celebration, the Karlsruhe Technical University conferred high academic distinctions on Friedrich Uhde and K. Riese. The former, a pioneer in the construction of high-pressure installations for carrying out chemical processes in the manufacture of bulk materials, thus became honorary Doctor of Engineering; while the latter, manager of the Bayer Works in Leverkusen, was made honorary senator of the Karlsruhe Technical University.

Rubber Industry Statistics

After four years of unprecedented expansion (1948 to 1952) the motor vehicle and bicycle industry experienced a setback in the beginning of 1953 sufficiently marked to justify the widely held opinion that the saturation point had been exceeded and that future business would have to be at a lower level. But though production of trucks had to be reduced, activity in motor cycles and passenger cars took an unexpected upturn that sent totals for the first half of 1953 above the figure for the corresponding 1952 period and even over that of the second half of 1952.

Tire production more or less followed the same pattern, but it was noted that increases were mainly due to replacement orders, especially for tires for motor cycles. In the final analysis, compared with the first half of 1953, there was an increase of 8.5% in tire production as a whole in the first half of 1952, but a decrease of more than 7% for the second half of that year.

In the production of rubber goods other than tires, all groups except conveyor belting, which remained practically unchanged, showed increases in the first half of 1953, as against that for the same period of 1952; compared with the second half of 1952, substantial reductions occurred in hard rubber goods and footwear (seasonal for the latter case), but the higher output of lined hose, surgical soft rubber goods, sporting goods and toys, and of rubber fabrics and articles made therefrom, was high enough to offset these losses, so that totals for rubber goods other than tires still exceeded the high level of the second half of 1952, though only by 2.4%.

The following table shows the production of rubber goods (in tons) in the Federal Republic of Germany during the first half of 1953:

Bicycle tires	5,853
Motorcycle and passenger-car tires	16,867
Truck and special tires	30,694
Tire repair material	5,263
Total tires	58,677
Other Rubber Goods	
Heels and soles	18,966
Footwear	6,213
Conveyor belting	3,508
Lined hose	4,990
Other soft rubber mechanical goods	19,337
Surgical soft rubber goods including sponge, cellular rubber, and foam rubber goods, toys, and sporting goods	4,112
Rubber fabrics and articles thereof	2,779
All other soft rubber goods	8,509
Hard rubber goods	2,845
Total, other rubber goods	71,259
Grand total	129,936

The German rubber industry used 48,126 tons of natural rubber, 5,016 tons synthetic rubber, and 15,072 tons of reclaim, altogether 68,214 tons, in the 1953 period, and employed an average of 63,239 persons, of whom 53,473 were factory workers.

The marked rise in the output of goods under the head, -surgical soft rubber goods, mentioned above, was largely due to the growing German interest in sponge and foam rubber products; while the higher output figures for rubber fabric and articles thereof and to some extent also of lined hose partly reflects the strong trend toward using plastics that is becoming increasingly noticeable in the rubber industry here, since the figures for the products made from plastics are included.

In the later months of 1953, business reportedly continued for the most part active, and certain branches are not only holding their own, but are expanding. Nevertheless a feeling of uneasiness in some circles has been apparent, inspired largely by fear of an impending crisis in American economy.

Local Trade Notes

Prof. Hermann Staudinger, of Freiburg University, West Germany, has received the Nobel prize for chemistry. His work on the molecular structure of cellulose, albumen, rubber, and all kinds of resins, leading him to the conclusion—revolutionary at the time—that these substances were made up of ordinary organic molecules which were unusual only in that they were very large and were not all exactly alike, may be said to have laid the foundations of the modern plastics industry.

A finishing coat of lacquer is frequently applied to improve the appearance of rubber goods. Cella Celluloid-und Lackwerke G.m.b.H., Wiesbaden, supplies a baking lacquer for this purpose, which is dried by infrared rays. The drying time by this means is said to be about 1½ minutes, and the infrared rays do not heat the rubber very much so that quality is not affected. By this method, it is claimed, a smooth, flexible, glossy, and flex-resistant surface is obtained that is firmly bonded to the rubber and will not peel off. The lacquer is supplied in practically all colors and can be applied by spreading, dipping, or spraying.

New Materials

Acetoacet-o-Anisidide Available

THE commercial availability of acetoacet-o-anisidide, usually obtained from foreign sources in the past, has been announced by Carbide & Carbon Chemicals Co., 30 W. 42nd St., New York 17, N. Y. The material is important in the manufacture of yellow benzidine pigments, such pigments having superior resistance to heat, and of chemicals used in coloring rubber products, according to the company.

Another chemical of the same family, acetoacet-m-xylidide, has also been introduced by Carbide as a domestically manufactured material recommended for use in the production of yellow benzidine pigments. Such pigments exhibit remarkable light-fastness and are used in the printing inks and textile printing industries, the company states.

Powdered Cellosize Hydroxyethyl Cellulose

A new, low-salt type powdered Cellosize hydroxyethyl cellulose has been introduced to the industry by Carbide. A water-soluble, light-colored, free-flowing powder containing 90% hydroxyethyl cellulose, the new material is being offered in three viscosity types: Cellosize WP-09, WP-3, and WP-300. Five per cent. solutions of these types at 20° C. have approximate viscosities of 100, 300, and 30,000 centipoises, respectively.

It is expected that these new, low-salt powders will replace the older solution types of the material as thickeners, stabilizers, film formers, dispersants, and binders in aqueous systems.

Polystyrene Cement—Sty-Fil

A TRANSPARENT cement which features the ability to "fill in" irregularities and ruptured areas while sealing joints has been announced by Adhesive Products Corp., New York, N. Y. Designated Sty-Fil, the new adhesive is designed for bonding styrene to itself with a waterproof seam.

Specifications for the cement, which is applicable by conventional brush methods or by use of a felt pad saturated with the material, include: viscosity, 80 centipoises; drying time, 10-45 seconds; and weight, 7.2 pounds per gallon. The company recommends the solvent-containing product for use in the toy and novelty industries.

Adhesive for Styrofoam — Styrogrip

Styrogrip, a transparent adhesive for bonding Styrofoam (foam styrene), also has been developed by Adhesive products. Claimed to be rapid drying with an exceptionally fast grab, the new material can be applied by either brush or squeeze bottle in the production of displays, toys, etc. Specifications for the adhesive include: specific gravity, 0.96; viscosity, 15,000 centipoises; solids content, 40%; and vehicle, organic solvents.

Rubber-Plastic Molding Compound — Ortex

Adhesive Products also recently introduced a new rubber plastic, Ortex, which is claimed to be a complete formula for constructing molded orthopedic appliances. Devised to simplify the task of fabricating such units as arches, metatarsal pads, etc., the compound is supplied in two parts, a solid and a liquid.

Fabrication of an article requires only mixing the granular and liquid materials, placing the mixture into a plastic mold at room temperature, and drying. The molded product resulting will be neutral in color, light in weight, and firm but resilient. Little shrinkage of the product can be found, according to the company, and the finished article is resistant to heat and perspiration.

Adhesive for Metallized Plastics

Metagrip, a transparent adhesive designed for use on metallized acetate, butyrate, or polystyrene plastics, likewise comes from Adhesive Products. This new product can also be used to adhere ordinary plastic to the metallized material and to metal, according to the company.

Major advantage of the Metagrip, designated No. 3799, is that the metallic finish of plastics will not peel or run as a result of the application of Metagrip. The manufacturer also represents the adhesive to be fast drying and capable of withstanding considerable shock when dry.

Phenolic Finish — Logo Force P-85

A MATERIAL for finishing phenolic plastic, based on relatively recent developments in the polyester resin field, is available from Logo, Inc., Chicago, Ill. Known as Logo Force P-85, the new material reportedly provides a finish that has greatly improved hardness and adhesion over those of conventional products without becoming brittle even on heat aging.

P-85 is manufactured in both plain and metallic pigment forms, the latter of which is expected to find wide use on consumer products. Composed of no suspended particles, the material is recommended for spray application (50-90 psi.) after mixing with supplied catalyst. After air drying for 10-30 minutes and baking for 30 minutes at 250° F. (higher temperatures require less time), the resulting film will withstand such tests as 1,000 hours at 100° F. in a humidity cabinet, the grease test, chemical and solvent tests, water soak test, etc., according to the manufacturer. Furthermore, the company reports that no brittleness of the finish will result from one week of exposure to a dry oven heat of 158° F.

Vinyl Combining Cement

A NEW Vinyl Combining Cement, Code No. D-456, has been announced by Claremont Pigment Dispersion Corp., Brooklyn, N. Y., for use in the manufacture of nylon-supported vinyl sheeting on standard combining equipment. The cement is offered as a pourable, viscous compound completely free of volatiles. Maximum properties are obtained when the cement is cured at a temperature of at least 350° F., but satisfactory adhesion has been developed at temperatures as low as 280° F.

Application of the adhesive in film thicknesses up to one-half mil is sufficient for good performance and can be accomplished by reverse roll coating or a printing process on either the nylon or vinyl surfaces. Both fabrics are then heated, and lamination is effected by simultaneous passage of both webs through a calender or laminating machine. Pressures from 5-10 psi. are required for proper lamination.

The cement attains its ultimate properties upon cooling to room temperature. The laminate's bond strength and degree of penetration of the adhesive into the supporting fabric depend mainly on the thickness of the adhesive applied. Laboratory tear tests on eight-mil vinyl film bonded to nylon tricot indicate a bond strength of 40 pounds per linear inch. The cement is said to be resistant to staining and reduction of bond strength upon aging.

PVC Plastisols for Protective Coating

FOUR types of Magic-Vulc plastisols are being manufactured by Magic Chemical Co., Brockton, Mass., for use in coating surfaces with a protective film to guard against abrasion and corrosion. The new materials are capable of being applied by brush, spray gun, or dipping to metal, wood, concrete, fabric, and other surfaces, according to the company.

Primary advantage of the plastisols is that they do not contain any solvent. This allows for formation of thicker coatings than with other vinyl coating materials and minimizes shrinkage of the applied coat. Compounded ready for use, the products range from syrupy to putty-like consistencies and, following application, require only a few minutes of 350-375° F. heat to set to a tough, flexible film.

The available Magic-Vulc plastisols are: No. 192-H, an anti-corrosion coating which requires the use of a Magic-Vulc primer; No. 7-E, a plastisol for molding and casting; No. 7-D, a plastisol putty for molding and casting; and No. 192-G, a sealing and potting compound.

Fatty Acid — Oleic Acid 905

OLEIC ACID NO. 905, a new highly distilled fractionated fatty acid, had been developed by the industrial oils department, Swift & Co., Hammond, Ind. Intended to meet the demand for a material with a high acid number, low titer, and clear color, the product is manufactured by new processes which reportedly allow for more selective extraction of color bodies and unsaponifiable material. Specifications given for the acid include: maximum titer, 5; free fatty acid content (as oleic), 98-102%; acid number, 195-204; iodine number, 90-96; saponification number 198-204; unsaponifiable content, 1% maximum; and color (Lovibond, 5¼-inch column), 10 Y/1.0 R, maximum.

Rubba Latex Binder

A LATEX binder, described by the manufacturer as flexible, quick-drying and self-curing, has been announced by Rubba, Inc., 1015 E. 173rd St., New York 60, N. Y. Developed as a binder for jute, sisal, and other fibers, the new material is said to impart a flame-resistant quality to the fibers with which it is used.

As a water dispersion, Rubba Latex Binder is capable of being diluted to a considerable degree without impairing its binding qualities. It is supplied with a solids content of 40% (specific gravity of 1.152) and will result in adding considerable resiliency and wear resistance to products, according to the company.

Epoxy Resin Intermediate—Cardolite 6463

CARDOLITE 6463, a cashew bis phenol, is available from Irvington Varnish & Insulator Division, Minnesota Mining & Mfg. Co., Irvington, N. J., for use as an intermediate in the preparation of epoxy resins having greatly improved flexibility in the cured state. The compound consists of a phenol substituted in the meta position with a 15-carbon straight chain, with one or more other phenol molecules attached in their para positions at various points along the chain. The compound has a molecular weight of 410, nearly twice that of the usual bis phenol.

The product is said to require only about half the usual quantity of epichlorhydrin when used in the preparation of epoxy resins. In addiiton, resins made from Cardolite 6463 are readily soluble in aromatic hydrocarbons.

Porcelain Mold Cleaner

RAPID removal of latex, coloring matter, and other adhering residues from porcelain molds used in the production of dipped goods is said to be possible with D-Scale-RW, an inhibited acid cleaner made by Magnus Chemical Co.. Garwood, N. J., for the removal of rust and scale in metal-working operations. The material is sold in the form of a stable white powder that is chemically inert until dissolved in water, when it becomes a powerful acid cleaner. Because of its powder form, the material is completely safe to store and handle, unlike the nitric and other acids commonly used to clean dipping molds.

For cleaning porcelain molds a solution is made up of one pound of D-Scale-RW per gallon of water and heated to 150° F. Molds are soaked in this solution for 5-10 minutes to do the cleaning job that requires two hours with mineral acids. A pressurized water rinse is then used to remove the cleaning solution without the need of hand brushing of the mold.

Adhesiyes for Mylar Bonding — L272 and L440

TWO new adhesives, Bondmaster L272 and Bondmaster L440, both specifically developed for bonding Mylar polyester film (produced by E. I. du Pont de Nemours & Co., Inc.) to a wide range of papers, plastic films, fabrics, etc., have been announced by Rubber & Asbestos Corp., Bloomfield, N. J. The former type of adhesive is designed to maintain physical strength and high insulating characteristics over long periods at elevated temperatures; while the latter is intended to maintain an extremely high degree of color stability with a very high degree of water and live steam resistance.

Bondmaster L272, offering high dielectric strength, was specifically formulated for the manufacture of laminations used in machine and motor applications and is claimed to retain full bond strength after constant exposure to 320° F. for four weeks. Specifications for the adhesive include: color, brownish clear; base, synthetic rubber resin; vehicle solvent, naphtha; viscosity, 7,000 centipoises; tack life, long; weight, 6¾ pounds per gallon; solids content, 31½%; odor, faint residual; and storage life, one year. Application of the material to the film is made by a roller coater.

Bondmaster L440, unusually resistant to hydrolysis, is said to retain a strong, fibre-tearing bond without discoloring after being subjected to a live steam sterilization chamber for 30 minutes at 250° F. Specifications for this material, also applicable by roller, include: color, clear or white; base, synthetic resin; vehicle solvent, toluene; viscosity, 5,000 centipoises; weight, 7½ pounds per gallon; solids content, 22% (clear) or 23% (white); odor, none; and storage life, indefinite.

Non-Foaming Surface Lubricant—Dura-Lube

A SAPONACEOUS type of rubber surface lubricant known as Dura-Lube has been developed by The DuBois Co., Inc., 1120 W. Front St., Cincinnati 3, O., for use in those operations where foaming is hazardous and where the use of defoamers in the lubricant is not permitted. Primary application of the new material at present is in batch-off and stock spray operations.

The company describes Dura-Lube as a transparent, pale liquid of relatively low viscosity. It is completely soluble in water with virtually zero foaming tendency, although these characteristics are true to a lesser degree with "hard" water, and is non-allergenic, non-corrosive, and almost odorless.

Limited shipments of the lubricant can be obtained from DuBois for evaluation.

Silicone Release Agent

A NEW silicone fluid, identified as Dow Corning 555 Fluid, is said to be remarkably compatible with organic materials, according to the manufacturer, Dow Corning Corp., Midland, Mich. Designed primarily as a non-separating functional ingredient for ointments and cosmetics, the fluid is claimed to show considerable promise as a release agent for specialized applications; as a plasticizer for certain rubbers, resins, and plastics; and as an additive for paints and petroleum products.

The material is an odorless, water-white liquid that is easily diluted with lanolin, beeswax, mineral oil, and 95% ethanol. Because of its greater volatility, 555 Fluid alone does not exhibit the high order of water repellency, temperature stability, and oxidation resistance of standard dimethyl silicone fluids; for example, its useful temperature range is limited to -70 to $+300°$ F. An alcohol solution of the new fluid displays these properties to a much higher degree than any emulsion of the standard fluids because it is not hindered by emulsifiers.

Vinyl Dispersion Resin for Plastisols—Opalon 410

A STIR-IN type of vinyl paste resin, developed for use as the base resin in the preparation of vinyl plastisols, has been announced by Monsanto Chemical Co., Springfield, Mass. Designated Opalon 410, the new material is expected to find application in textile and paper coatings, slush molding, dipping, and foam and sponge manufacture.

Monsanto claims that the resin can be easily dispersed in plasticizers, mixtures of plasticizers, and/or thinners, with the resultant plastisol having low viscosity. The fused plastisol (curing temperature, 340° F.) will provide tough, abrasion resistant films and coatings which have exceptional water and chemical resistance.

Specifications for the resin are given by Monsanto as follows: specific gravity, 1.40; specific viscosity (0.40-gram in 100 milliliters of cyclohexane at 25° C.), 0.53; particle size, 1-2 microns; dry bulk density, 0.25-0.35-gram per cubic centimeter; loss in weight on heating, 0.5% maximum; and ash content, 0.5% maximum.

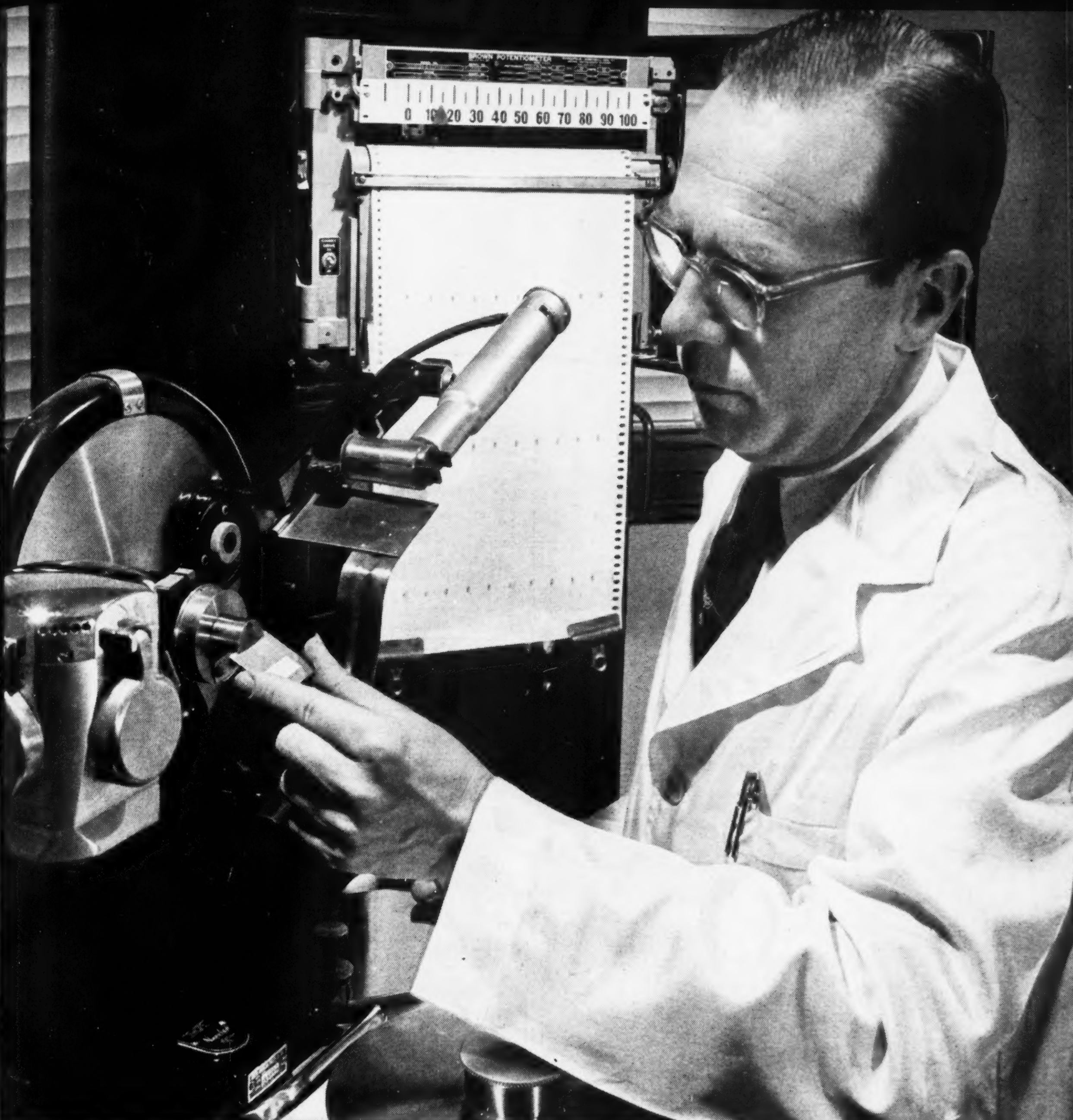
Vinyl Plasticizer—Pittsburgh PX-118

PITTSBURGH PX-118, an iso-octyl decyl phthalate plasticizer for use in polyvinyl chloride products, has been developed by Pittsburgh Coke & Chemical Co., Pittsburgh, Pa. Described as having lower volatility and a higher degree of permanence than DOP, the new material is recommended for use in high-temperature processing cycles and in calendering and coating operations involving the exposure of large surface areas.

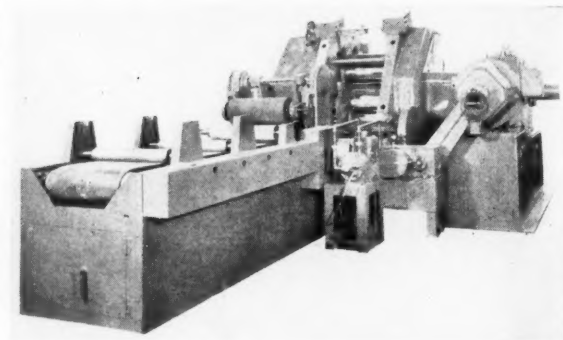
In vinyls, PX-118 reportedly provides long life and an excellent resistance to extraction by various materials. The low-temperature flexibility of such products are approximately equal to those containing DOP, and plastisols which employ these plasticizers are of approximately equal viscosity, it is reported. Pittsburgh PX-118 plastisols, however, are characterized by superior viscosity stability, according to the company.

Generally compatible with all resins for which DOP is satisfactory, the new plasticizer is represented to have the following specifications:

Specific gravity, 25/25° C.	0.973
Color, A.P.H.A., maximum	50
Acidity (as acetic), %, maximum	0.007
Ester content, %, minimum	99
Moisture, %, maximum	0.1
Ash, %, maximum	0.001
Odor	Mild


BROWN POTENTIOMETER
0 10 20 30 40 50 60 70 80 90 100

New Machinery

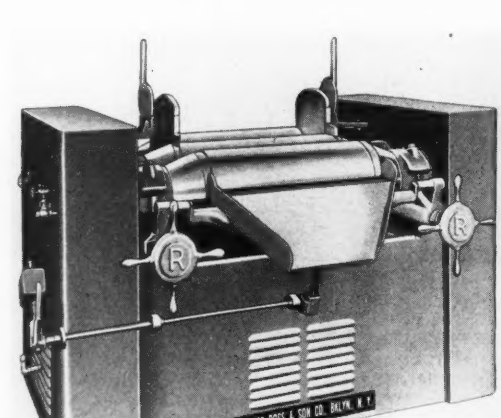


10½- by 20-Inch Cascade Calender with Take-off and Cooling Rolls

Double-Z Laboratory Calender

A SIX-ROLL, 10½- by 20-inch laoratory calender is being offered by Adamson United Co., 730 Carrol St., Akron 4, O., for use in experimental work on plastics and rubber. Such investigations as the determination of the arc of contact on finished film (by feeding to the top or to the bottom bank of rolls), and the performing of double contact work where each coat is subjected to two passes before being laminated with fabric or other material (by feeding the stock between the third and the fourth roll) are possible with the machine, according to the company.

The calender is constructed at an angle of 20 degrees, with each pair of rolls located at an angle of 90 degrees to the previous pair. Other features of the unit include a choice of antifriction or conventional sleeve bearings (both lubricated by a circulating oil system) and an electrically regulated drive which provides a 10-1 speed range. Cooling, slitting, and surface-type windup operations can be performed with the calender by using accessory equipment available from Adamson.



Ross #52TC High-Speed Three-Roll Mill

Three-Roll Mills

A NEW series of high-speed three-roll mills, easily converted for use in either fixed or floating center roll operation, has been announced by Charles Ross & Son Co., Brooklyn, N. Y. Designated as #52TC mills, the machines can be converted within minutes from conventional mills with fixed center roll and four-point adjustment to floating center-roll units with two-point adjustment. Conversion is said to be accomplished without special tools or skill by the operator.

The mills also feature a higher ratio of differential roll speeds for maximum shear, and an apron adjustable for raising or lowering the knife contact point and for varying the apron angle on the front roll. The apron is balanced for constant, uniform pressure of the knife on the front roll to compensate for knife wear and prevent recycling of material back into the mill. Mills with manual roll adjustment have ball thrust bearings on the adjusting screws. Calibrated indicating dials assure parallelism of the roll faces with corresponding dial readings. The new mills are made in six sizes, as follows: 4½ by 10, 6 by 14, 9 by 24, 12 by 30, 14 by 32, and 16 by 40 inches.

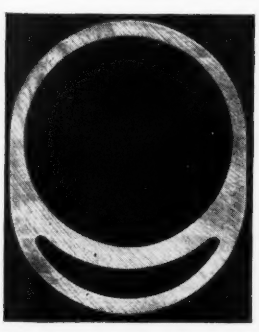
pH Meter

Analytical pH Meter

A POCKET-SIZE pH meter, completely self-contained with batteries and companion probe unit, is available from Analytical Measurements, Inc., Chatham, N. J. Contained in a plastic case measuring 3 by 5⅞ by 2½ inches and furnished with a carrying case, the meter is graduated from two to 12 pH and can be read to an accuracy of 0.1 pH.

Feature of the unit is the combination of the calomel and glass electrodes with the sample holder into a single polyethylene probe unit. As a result, these vital parts are completely protected and require a sample volume of only 0.5-milliliter for testing. Hearing-aid-type batteries reportedly provide up to 1,300 hours of operation. Other construction features of the three-pound meter include: electrometer tube, switch, and input connector sealed in a single unit; one-knob control; and complete shielding of the instrument and the electrode.

Steam-Traced Aluminum Pipe

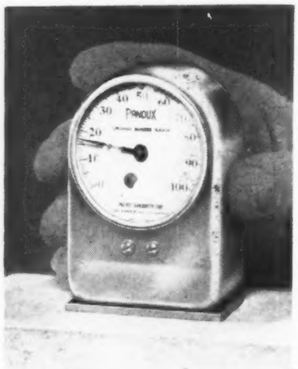

Cross-Section View of Steam-Traced Pipe

"UNITRACE," an integrally extruded steam-traced aluminum pipe, is being manufactured by Aluminum Co. of America, Pittsburgh, Pa., for use in handling chemicals that require heating to prevent solidification or crystallization within the pipes. Cost savings in material, insulation, and labor and increased efficiency in operation are advantages to be gained from its use, according to the company.

The new pipe, result of a joint engineering effort by Alcoa and Hercules Powder Co., is extruded as a single unit from Alcoa 3S-F aluminum alloy. It is slightly oval in cross-section because of the crescent-shaped steam passage adjacent to the product line. Shop fabrication of standard lengths of the new piping is easily performed, the manufacturer states, by using conduit tools.

Presently available in only one size, two inches in diameter (Schedule 40), "Unitrace" reportedly exhibits greatly improved heat transfer properties over normal steam-tracing techniques, thus eliminating the expense of purchasing and installing steam jacketing. In its original installation, savings of 38¢ a foot in material, 5¢ a foot in insulation, and 30% in labor costs over conventional two-inch steam-jacketed lines were realized. Preformed insulation of a larger size (2½ inches in the case of the two-inch line) will fit Unitrace, although the company expects that use of thermal insulation will be unnecessary in many cases.

Foam Rubber Resiliency Tester

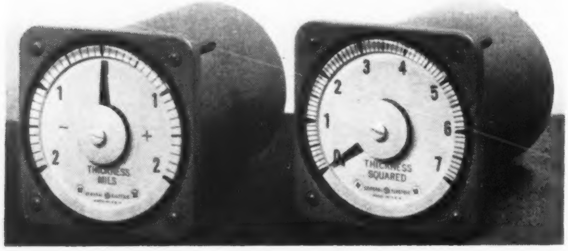


Pandux Foam Rubber Gage

A HAND-INDICATING device for measuring the hardness or resiliency of foam and sponge rubber and other soft elastomers has been developed by Pacific Transducer Corp., Los Angeles, Calif. Known as Model 302S Pandux foam (sponge) rubber tester, the new instrument indicates, in addition to the resiliency range of the material (soft, medium, or hard), a scale value within the range.

The principle of the testing device is that the displacement resulting from the application of a given load over a given area is an indication of the resistive quality of the material. The values on the Pandux scale are based on the displacement of a constant load of 250 grams over an area of one square centimeter.

In operation, the instrument is pressed against the rubber in order to make its base flush with the material's surface. According to the company, this action permits the indentor to give a direct, fully reproducible reading on the dial. In the interest of accuracy, however, the manufacturer recommends that the material specimen be at least 3/4-inch thick, either as one piece or as stacked thinner samples.



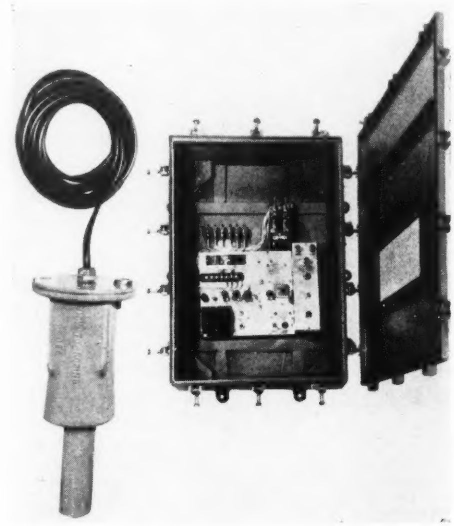
Current Integrating *(Left)* and Current-Squared Integrating *(Right)* Instruments for Obtaining Mean Thickness Deviation and Mean Square Thickness Deviation, Respectively

Integrating Instruments for Statistical Dimension Control

TWO new integrating instruments, one direct current-integrating and the other alternating current-squared integrating, designed for use with a Pacific evenness integrator to determine the thickness, width, diameter, or other variable dimension of film or thread in continuous moving process, have been developed by General Electric Co., Schenectady, N. Y. The mean deviation and the mean square deviation are indicated by the respective instruments; such data are easily translated to the average dimension and the standard deviation of that dimension. Primary advantage of the new devices is the saving realized by elimination of much of the time and expense required to make the dimensional measurements and to record and compute the results, thus facilitating statistical quality control of the process.

The current integrating unit has a permanent magnet, moving coil driving mechanism; while the current-squared integrating instrument has a dynamometer-type driving mechanism. The speed of the pointers of the instruments at any instant is proportional to the current and to the square of the current, respectively. When current ceases to pass through the coils, the instruments' pointers stop instantly, affording unusually accurate readings. Constructed without control springs, the devices are equipped with special mechanisms to provide a high degree of damping, and with control circuits to reset the pointers to zero.

The directly proportional unit is rated from —85 to +85 milliampere-seconds with an accuracy of ±2% of the full scale for integrating random-varying currents lasting over a period of two minutes. The current-squared instrument has an accuracy of ±3% for integrating such signals over the same period. Adequate response to instantaneous current values from 0.03-6 and from 1.5-30 milliamperes for the respective instruments is claimed by the company.



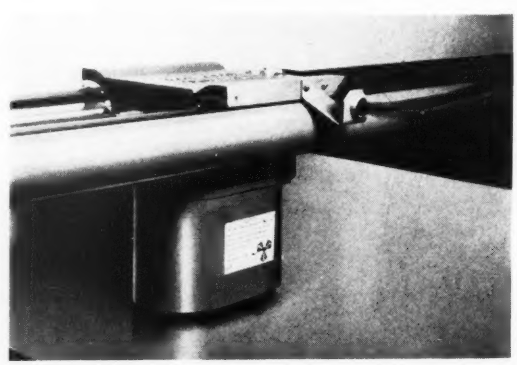
Probe and Receiving Unit of Robintronic Level Indicator

Level Indicator for Storage Units

THE Robintronic level indicator, an electronic signal device that uses radio waves to indicate the level of the stored material, has been developed by Hewitt-Robins, Inc., Stamford, Conn. Intended for use with bulk materials, the unit can be attached to an alarm system or to the controlling mechanism which regulates the material flow.

The device consists of a small radio transmitter, housed in a steel probe, and a radio receiving unit. The probe is placed in the storage bin at the level where the flow of material is to be controlled. When the material envelopes or exposes the probe, the change in surrounding density distorts the signal being transmitted. This action, in turn, actuates the control mechanism.

Designed with no moving parts, the device will withstand the effects of vibration, extreme temperature, dust, corrosion, moisture, and voltage fluctuations, it is claimed. Its less rugged parts (the receiving set) can be placed as much as 300 feet or more from the probe for protection and remote control requirements.



AccuRay Reflection Gage over Coated Sheet

New Beta-Ray Thickness Gage

A NEW model AccuRay beta gage, designed for determining the thickness of coatings on a base material or of sheets passing over a roll, has been added to the line of thickness meas-

(Continued on page 434)

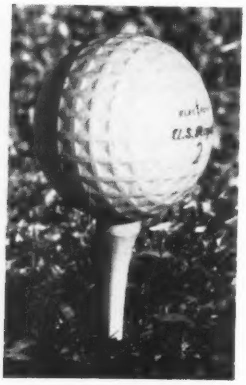
New Goods

Refrigeration Service Hose

THE development of two new refrigeration service hose, designed for the lowest possible diffusion of refrigerants, has been announced by Electric Hose & Rubber Co., Wilmington, Del. The hoses also feature freedom from contamination of the refrigeration system, resistance to oil, and excellent serviceability over a temperature range from —40 to +250° F. Suggested applications include refrigeration units in boxcars, ships, trucks, and cold storage rooms, as well as in air conditioning units for industrial and home use.

Two styles of hose are currently being offered in inside diameter sizes from 3/8-1 1/4 inches. One style, 3541, is designed for use with Freon 12 refrigerant; while the other style, 3542, is intended for use with Freon 22. The hose can be made with either textile or wire reinforcement to meet customer requirements.

Golf Ball with Diamond Cover Marking



U. S. Royal Golf Ball with a Diamond Pattern on Its Cover

THE introduction of a golf ball with a new diamond cover marking that should add at least 10 yards to the golfer's drive has been announced by United States Rubber Co., Rockefeller Center, New York 20, N. Y. The result of applied aerodynamic principles, the new cover design is said to give the ball greater lift and added flight time, thus making possible the increased yardage.

The appearance of the ball has also been improved, according to the company, as a result of the cover pattern; the new markings permit more even distribution and coverage of paint, producing a whiter product. Construction of the unit is similar to other U. S. Royal golf balls, featuring the thin, fully cured Cadwell cover, silicone rubber center, and electronic winding.

Vinyl Flooring Line

"H.D.H.," a new heavy-duty homogenous vinyl flooring series, is available from Goodyear Tire & Rubber Co., Akron, O. Substantially lower maintenance costs on larger commercial installations is the primary advantage offered by the new product, according to the company, because of the prepolishing feature of the flooring that eliminates waxing.

The new line is an addition to the present Goodyear Homogeneous Vinyl flooring series which is styled to the requirements of residential installations. "H.D.H." is manufactured in eight colors and black in gages of 1/8- and 3/32-inch. It is available in either tile or roll form for applications where long life is required.

Fiberglas Window Screening

WINDOW screening woven of Fiberglas and coated with a pigmented Bakelite vinyl resin is now available through hardware stores from Bakelite Co., New York, N. Y. Among the advantages of the new product, in addition to the properties of the materials used in its construction, are the ease with which the material is cut without raveling or injuring the hands and the ease with which tears or punctures are repaired.

Since the individual strands of resin-coated Fiberglas are heat-set into the mesh, repairs are made by sealing a small patch of coated screen over the damaged spot with an electric iron, according to the company. The screening, manufactured by Owens-Corning Fiberglas Corp., is available in aluminum, bronze, and green colors in widths from 24-60 inches.

New Truck Tire

Highway 110 Truck Tire by Seiberling

THE Highway 110, a new long distance truck tire claimed to feature a flatter tread, better traction, and longer wear than conventional tires, has been developed by Seiberling Rubber Co., Akron, O. In addition to putting more rubber on the road, the tire's flatter tread has a five-rib claw-grip design said to minimize skidding and side slip. Other features of the new tire include the use of heat vents extending up into shoulders; special tread grooves for added protection against cracking; and cords pre-stretched to equalize tension and reduce tire "growth." The tread grooves are rounded at the bottom, have nearly vertical sides, and are reinforced with extra rubber at the base. The Highway 110 is being made in sizes from 7.50-20 to 11.00-24.

Oil Resistant Vinyl Film—Ultron R 117

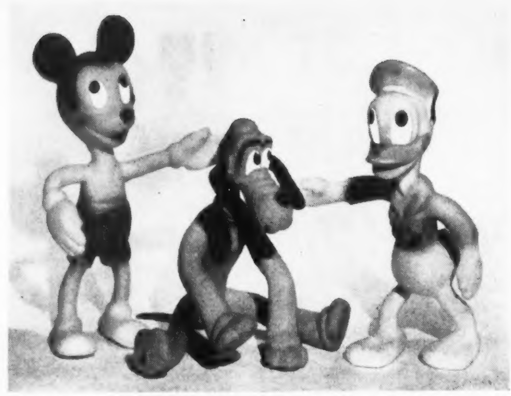
AN OIL resistant formulation of Ultron vinyl film has been developed by Monsanto Chemical Co., Springfield, Mass. Called Ultron R 117, the new material will retain its flexibility even after long periods of immersion in oils and water because of low extraction characteristics, it is claimed.

The film is also reported to be highly resistant to organic and inorganic acids, alkalies, animal, vegetable, and mineral oils, and a variety of organic solvents. A non-migratory material, it will not attack painted and varnished surfaces, a characteristic which recommends its use as a protective and decorative cover for office and commercial equipment.

Inflated Plastic Swim-Aids

A SERIES of clever vinyl inflatables for use by tots as swim-aids and water toys is being made by Doughboy Industries, Inc., New Richmond, Wis. Appropriately printed in brightly colored designs, the inflatables feature double-layer construction of durable Krene plastic, a product of Bakelite, that withstands rough use, abrasive sand, sunlight, grease, and sun-tan oils. The series includes an Indian canoe which fits around the child's waist, leaving arms and legs free to paddle and splash; a 56-inch long alligator with center cut-out to fit the child; a fireboat with built-in smokestack whistle and fire-fighter's squirter also made with a center cut-out; and an easy to handle toddler's raft that is 33 inches long and 17 inches wide.

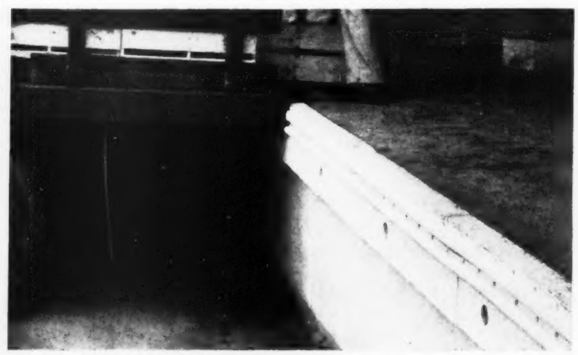
New Inflated Vinyl Water Toys for Tots Include *(Top Left)* Indian Canoe, *(Top Right)* Alligator, *(Bottom Left)* Fireboat, and *(Bottom Right)* Raft



Foam Rubber "Bend Me" Toys: *(Left to Right)* Mickey Mouse, Pluto, and Donald Duck

Wire-Inserted Foam Rubber Toys

FOAM rubber "Bend-Me" toys in the form of Walt Disney characters are being made by Bayshore Industries, Inc., Elkton, Md., with wire inserts that permit the toys to be shaped or twisted into any position. Packaged individually in transparent bags with Disney decorations, the toys include Mickey Mouse, Donald Duck, and Pluto characters. Colorfully finished, the toys make attractive decorations for playrooms and nurseries.



Neoprene Bumper Strips on Truck Loading Platform

Bumper for Truck Loading Docks

A NEW shock absorbing bumper, made of du Pont neoprene to assure long service life, has been developed by Everguard Co., Newport Beach, Calif., as a practical solution to the problem of damaged wood facing boards on truck loading platforms. Mounted in continuous strips along the dock, the bumper eliminates scraping and gouging and prevents cracking from all but the severest collisions, it is claimed. The bumper has a half-round molding 1¾ inches wide on a flat base 2¾ inches wide and comes in hollow 14-foot lenghts containing longitudinal inner webs to provide the necessary resiliency. Wall thickness averages about ¼-inch, and each section is extruded without seams or joints between molding and base. The bumper is installed by nailing along the upper and lower flanges, with individual sections abutted to form a strip of any desired length.

Ceramic Tile Adhesive

CTA-11, a tan-colored, synthetic rubber material that reportedly permits faster, better, and lower-cost installation of clay tile on wall surfaces, has been announced by the adhesives and coatings division of Minnesota Mining & Mfg. Co., Detroit, Mich. The adhesive can be used as supplied, has a buttery consistency, and will set more tile than any other previously available tile adhesive, the company states.

One gallon of CTA-11 will cover from 60-70 square feet of surface when the recommended notch dowel method of applica-

(Continued on page 423)

Editor's Book Table

BOOK REVIEWS

"Polymer Degradation Mechanisms." National Bureau of Standards Circular 525. Cloth, 6 by 9¼ inches, 284 pages. For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Price, $2.25.

This volume is the proceedings of a symposium on polymer degradation mechanisms held at the Bureau of Standards on September 24-26, 1951. The 17 papers, with their discussions, included in the book show the progress that has been made in explaining the structure of polymers and the mechanisms of their breakdown. This information is of value in predicting polymer service life, inhibiting degradation more effectively, and devising better methods of accelerated testing.

The papers and their authors are as follows: "Mechanisms of Degradation of Vinyl Polymers with Special Reference to Polystyrene," H. H. G. Jellinek; "Mechanisms and Kinetics of Thermal and Photodegradation Reactions," R. Simha; "Photodegradation of Polymethyl Methacrylate," P. R. E. J. Cowley and H. W. Melville; "Effect of Heat and Light on Polyvinyl Chloride," D. Druesedow and C. F. Gibbs; "Photodegradation of Polyvinyl Chloride," A. S. Kenyon; "Role of Hydrogen Chloride in Polyvinyl Chloride Degradation," A. L. Scarbrough, W. L. Kellner, and P. W. Rizzo; "Aging of Vinyl Chloride and Vinylidene Chloride Polymers," C. B. Havens; "Alkaline Degradation of Polyacrylonitrile," J. R. McCartney; "Aging of Polyethylene," B. S. Biggs; "Photo-Oxidation and Stabilization of Polythene," A. R. Burgess; "Oxygen-Absorption Studies on Olefins with Structures Related to GR-S," J. R. Shelton; "Breakdown of Cellulose Esters by Heat and Light," G. C. DeCroes and J. W. Tamblyn; "Oxidative Degradation of Ethyl Cellulose," L. F. McBurney; "Study of Degradation of Polystyrene, Using Mass Spectrometry," B. G. Achhammer, M. J. Reiney, L. A. Wall, and F. W. Reinhart; "Rates of Thermal Degradation of Polystyrene and Polyethylene in a Vacuum," S. L. Madorsky; "Pyrolysis of Copolymers," Wall; and "Mechanism of the Degradation of Polyamides," Achhammer, Reinhart, and G. M. Kline.

"Materials and Processes." Second Edition. James F. Young. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. Cloth, 6 by 9 inches, 1,087 pages. Price, $8.50.

Written from the viewpoint of the engineer, this book provides the interrelated information needed to apply the engineering fundamentals of materials and processes to the design, production, and control of products. As such, the work is designed to be of particular value to the student, and this revised edition incorporates a major reorganization of the presentation to suit classroom use better.

In addition to modernization of the text to cover advances during the past 10 years, this new edition has been greatly expanded, and new chapters are added on rubber; ceramics; porcelain and glass; miscellaneous non-metallic materials; structure and properties of non-metallic materials; metallographic examination; and statistical methods for quality control. The subject matter is divided into two parts, covering materials and processes, and, as with the first edition, most of the presentation is devoted to metals.

"Organic Coating Technology. Vol. I. Oils, Resins, Varnishes, and Polymers." Henry Fleming Payne. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. Cloth, 6 by 9 inches, 683 pages. Price, $10.

This is the first of a two-volume work designed to provide a balanced treatment of the entire subject of organic coatings. This volume covers the chemistry, manufacture, and uses of oils, resins, varnishes, polymers, plasticizers, and driers used in clear coatings and as the vehicle for pigmented coatings. Volume II, now in preparation, will cover pigments and pigmented coatings.

Emphasis throughout this book is on practical aspects, and many specific formulations based on commercial materials are given. The author has also included a compact discussion of basic theory to provide an understanding of the physical and chemical reactions in coating technology. Individual chapters are devoted to fundamentals of film formation; vegetable and marine oils for organic coatings; varnish resins; varnishes; driers; volatile solvents; alkyd resins; urea and melamine-formaldehyde resins; rubber resins; plasticizers; cellulosic polymers; vinyl resins; acrylic ester resins; silicone resins; and test methods. A subject index is appended.

NEW PUBLICATIONS

Publications of E. I. du Pont de Nemours & Co., Wilmington, Del.

"Solution Coatings of 'Hypalon' Chlorosulfonated Polyethylene." BL-251. 12 pages. This report suggests compounds of Hypalon which are suitable for solution in solvents or for dispersion in non-solvents, recipes for which are included.

"The Role of Antioxidants in Improving Neoprene's Resistance to Ozone and Corona Cutting." BL-252. 3 pages. The requirements of a protective wax in addition to several parts of ozone protecting antioxidants in ozone resistant neoprene compounds, and the factors that must be considered in protecting such compounds against corona cutting are discussed.

"Unicel ND Blown Elastomer Sponge Elimination of Odor." BL-253. 4 pages. Compounding techniques for producing essentially odorless sponge through use of urea and a combination of melamine and diethylene glycol as activators for the decomposition of Unicel ND are contained in this publication.

"Cost-Quality Relation of Neoprene Type GN and Type W Compounds." 1 page. This insert discusses recipes and the physical properties and characteristics resulting by replacing Neoprene Types GN and GN-A with Type W.

Publications of B. F. Goodrich Chemical Co., Rose Bldg., Cleveland 15, O.

"Technical Newsletter." April, 1954. 6 pages. This publication covers a continuing series on plasticizer evaluation (five types) based on 100% modulus test, and stabilizer evaluation (14 types); both subjects are in relation to Geon polyvinyl materials.

"Hycar Technical Newsletter." Vol. II. 62 pages. This annual edition of the Newsletter is a compilation of the most important information contained in the issue published during 1953 plus some previously unpublished information on Hycar.

"Hycar Technical Newsletter." Vol. 3, No. 4. 4 pages. A recipe and test data for a high acrylonitrile polymer which meets all but one of the specification requirements of MIL-R-7362A, and the effects of a range of carbon black types on Hycar 1012 are presented in this letter.

Publications of The British Rubber Producers' Research Association, 48 Tewin Rd., Welwyn Garden City, Herts, England:

"The Stability of Elementary Emulsion Drops and Emulsions." E. G. Cockbain and T. S. McRoberts. No. 189. 13 pages. The rates of coalescence of oil and water at the oil-water interface have been measured in the presence of various substances, and interfacial viscosity and tension data obtained for some of the systems. A main factor determining the stability of the systems investigated is advanced.

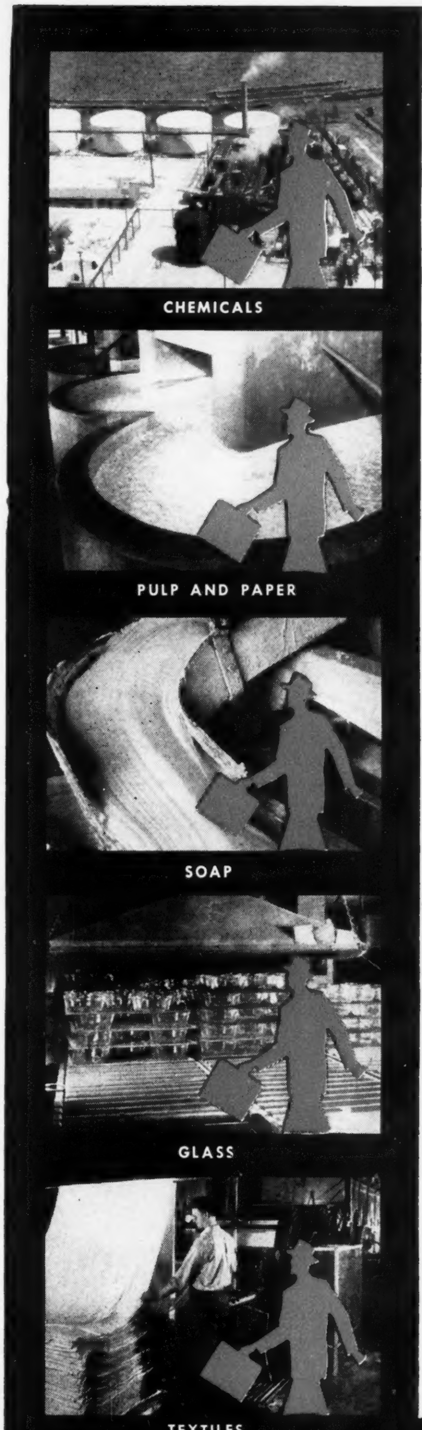
"Chain-Length Distribution Functions during Polymerization." W. F. Watson. No. 190. 8 pages. Such functions have been evaluated in terms of the directly measurable rate and rate of initiation, or the single equivalent measurement of number-average chain, and are recorded in this booklet.

"Chain-Length Distribution Functions of Polymers after Random Degradation and Cross-Linking, with Particular Reference to Elastomers." W. F. Watson. No. 191. 6 pages. Such functions, derived by a simple statistical treatment, are represented for all cases by special forms of an expression given here.

"Cabot Carbon Blacks under the Electron Microscope." Vol. 6, No. 12. Second Edition. Godfrey L. Cabot, Inc., 77 Franklin St., Boston 10, Mass. 105 pages. Originally printed in October 1949, and revised one year later, this publication describes the typical analytical properties of all color and ink blacks and rubber blacks produced by the company. Photographs of the material's structure and suggested applications of the blacks are also given, besides an explanation of the procedure followed and definition of terms used.

"Morpholine." Technical Bulletin, July, 1953. Jefferson Chemical Co., Inc., New York, N. Y. 44 pages. Characteristics and applications of this chemical (tetrahydro-1,4-2H-oxazine), its derivatives, and compounds as emulsifiers, rubber vulcanization accelerators, antioxidants, plasticizers, etc., are given in this publication.

"Quaker Spray Hose." Quaker Rubber Corp., Philadelphia, Pa. 4 pages. Five types of hose for spraying are described in this bulletin, with specifications and construction details.



Take a trip with a MATHIESON *Technical Service Man*

This man, typical of the Mathieson Technical Service Staff, is experienced on an industry-wide basis in the handling and use of industrial chemicals. Every day, as a trip with a Mathieson Technical Service Man would show, brings up new problems on which his broad experience is invaluable. For example:

A paper mill in New England is visited and advised on superbleaching with chlorine dioxide. A soap manufacturer in the Middle West wishes to discuss the advantages of low-iron caustic. A chemical plant in the East is counseled on the storage and handling of sulphuric acid. Several Southern textile mills are visited in connection with the storage of soda ash. A gray-iron foundry in Ohio is advised on controlling sulphur with Purite. A glass plant in the Southeast wants information on soda ash and nitrate of soda. A petroleum refinery in the Southwest seeks assistance on the handling of caustic soda, and several water works are advised on taste and odor control with chlorine dioxide.

And so it goes. More and more, industry is looking to Mathieson Technical Service for practical assistance on the handling and use of basic chemical raw materials. A call to your Mathieson representative is all that's needed to avail yourself of this industry-wide experience.

MATHIESON CHEMICAL CORPORATION
Mathieson Industrial Chemicals Division
Baltimore 3, Maryland

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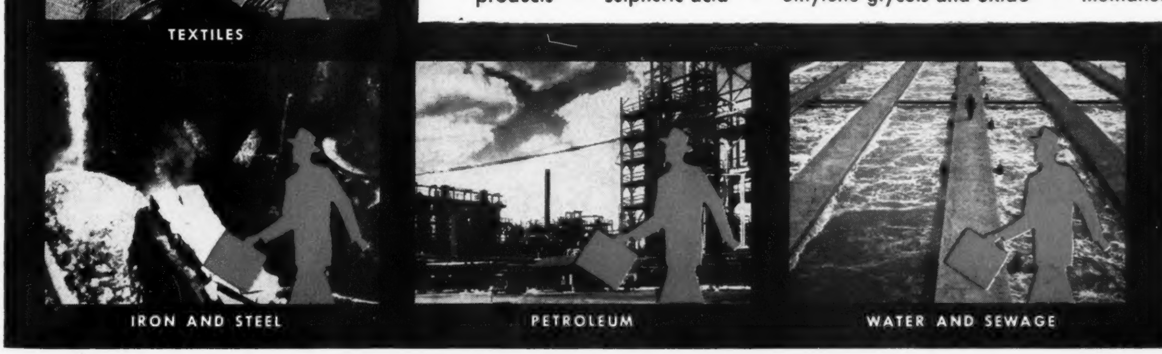
2022

caustic soda • soda ash • chlorine • sulphur • bicarbonate of soda
dry ice and carbonic gas • ammonia • sodium nitrate • nitric acid
hydrazine products • sodium methylate • sodium chlorite • hypochlorite
products • sulphuric acid • ethylene glycols and oxide • methanol



"NOBS Special Accelerator." American Cyanamid Co., Bound Brook, N. J. 4 pages. Intended for insertion in "Rubber Chemicals Catalog," this publication gives the general chemical and physical properties, specifications, compounding characteristics, uses, and analytical test methods for the accelerator.

"B. F. Goodrich Grommet V-Belts." Catalog Section 2170. The B. F. Goodrich Co., Akron, O. 8 pages. This catalog insert describes and illustrates Goodrich's patented grommet V-belts made in both standard and high-capacity constructions.

"Analytical Services." Foster D. Snell, Inc., 29 W. 15th St., New York 11, N. Y. 8 pages. The analytical services available from Snell are described in this booklet.

"Indonex Plasticizers in Oil Resistant GR-S Compounds." Circular 13-48. Indoil Chemical Co., 910 S. Michigan Ave., Chicago 80, Ill. 6 pages. Original and aged physical properties of compounds containing the three available Indonex plasticizers, along with the specifications for the plasticizers, appear in this publication.

"U. S. Electrical Wires and Cables for the Electric Utility Industry." United States Rubber Co., Rockefeller Center, New York 20, N. Y. 140 pages. This illustrated catalog contains engineering references and descriptions of insulated wire and cables made by the company. Also included are chapters on insulation compounds, jacket compounds, etc.

"Statistical Theory of Extreme Values and Some Practical Applications." E. J. Gumbel, National Bureau of Standards Applied Mathematics Series 33. Government Printing Office, Washington 25, D. C. 40¢. 51 pages. This is the revised text of material presented in a series of four lectures given by the author at NBS and brings together the procedures developed by many persons working in different fields. Some 10 tables and 38 figures are used to explain the described methods, which are based on the asymptotic theory of extremes.

"Sulphur Is Where You Find It." Freeport Sulphur Co., New York, N. Y. 16 pages. The methods of finding and extracting sulfur from Gulf Coast deposits are the subjects of this illustrated booklet.

"Schade Pressure Regulating and Relief Valves." Catalog No. 207. Schade Valve Mfg. Co., Philadelphia, Pa. 22 pages. The specifications and recommended applications of these valves appear in this publication.

"Mechanism of the Crystallization of High Polymers." G. Schuur. Rubber Foundation, Delft, Holland. Communication No. 219. 14 pages. An attempt is made in this paper to draw a clearer picture of the mechanism of crystallization and, thus, account for the origin of spherulities. Other phenomena involved in the crystallization of natural rubber are shown to be interrelated.

"Baldwin-Dunlop Statigun." Bulletin #123. Herman H. Sticht Co., Inc., 27 Park Pl., New York 7, N. Y. 2 pages. A description is given of the Statigun, a portable instrument designed to measure electrostatic charges on surfaces of materials such as plastics, belting, fabrics, and paper.

"Transmission, Conveyor, Elevator Belting Catalog." Boston Woven Hose & Rubber Co., Boston 3, Mass. 28 pages. The firm's rotocured belting is described in detail in this catalog. Each belting product is pictured, and information given as to its specifications, construction, and recommended uses.

"This Is Southern Latex." Southern Latex Corp., Austell, Ga. 8 pages. This brochure contains pictures of the management and plant of the company, which performs bulk latex compounding work.

"Materials Handling Equipment Engineered to Meet Your Needs." Palmer-Shile Co., Detroit, Mich. 44 pages. This illustrated catalog describes the company's materials handling equipment, including racks, pallets, skids, box and barrel grabs, trucks, work tables, storage bins, carts, and boxes.

"Now Constant Tension from Start to Finish in Winding Roll-Fed Material." Hobbs Mfg. Co., 26 Salisbury St., Worcester 5, Mass. 4 pages. The new "Alquist" winder of the company, described as a radically different type of winder, is covered in this folder, with text and illustrations of its construction and operation.

"Correct Tire Pressures for Passenger Cars." 1954 Edition. The Rubber Manufacturers Association, Inc., 444 Madison Ave., New York 22, N. Y. One-page chart, 11 by 17 inches. This display chart gives the tire sizes and correct inflation pressures for front and rear tires of 1954 model passenger cars, and of 1950-1953 models to a lesser extent.

"Baldwin-Tate-Emery Universal Testing Machine." Bulletin 4213. Baldwin-Lima-Hamilton Corp., Philadelphia 42, Pa. 4 pages. Models 20-35 and 60-35 universal testing machines of 20,000 and 60,000 pounds capacity, respectively, are described with specifications, principles of the hyydraulic straining system, and principles of the company's null method load indicator.

Publications of American Management Association, 330 W. 42nd St., New York 36, N. Y. All paper bound. Cost per booklet: $1.00 for members; $1.50 for non-members.

"Production Guides and Controls for the Modern Executive." Manufacturing Series No. 211. 52 pages. Five articles dealing with planning, selling, research, time and motion studies, and work sampling are presented in this booklet.

"Building up the Supervisor's Job." Manufacturing Series No. 213. 35 pages. Four articles presented in this publication deal with clarifying the foreman's status, communicating with the foreman, providing compensation to a foreman, and the personnel responsibility of line management.

"Motivation: The Core of Management." Personnel Series No. 155. 44 pages. In addition to a paper with the subject title, this booklet contains articles on the effects of prestige on behavior, two types of learning processes, human relation principles, and individual motivation.

Publications of the Reconstruction Finance Corp., Office of Synthetic Rubber, Washington 25, D. C. All are intended for insertion in "Specifications for Government Synthetic Rubbers, Revised Edition, Oct. 1, 1952."

"Specifications for GR-S 1009, 1010, 1011, 1013, 1018, 1019, 1022, 1503, 1504, 1707, and 1708." April, 11, 1954. These catalog inserts are revised specifications for the respective rubbers; such revisions are the addition of limits on stabilizer content.

Specifications for GR-S 2006." April 1, 1954. 2 pages. This insert gives the specifications for the latex formerly designated X-695.

"Determination of Ash." April 1, 1954. 2 pages. Revised test method C-2 is given here.

"Determination of Stabilizer." April 1, 1954. 6 pages. This is revised test method C-5.

"Specifications for X-759 and X-760." April 1, 1954. 1 page each. Specifications for the experimental polymer and latex, respectively, are contained.

"Specifications for X-617, X-667, and X-711." April 15, 1954. 1 page each. These revisions differ from previous specifications on these GR-S latices in that the Mooney viscosity requirement has been eliminated.

Publications of OSR for inclusion in "GR-S & GR-I Synthetic Rubbers" Sales Catalog:

"Table A—Hot GR-S Polymers." 3-1-54. 1 page. This page revises one-half of the table concerning the following revisions in polymer specifications.

"GR-S 1007, 1013, 1014, 1015, 1016, 1022, and 1023." 3-1-54. 2 pages each. Revision of the information given on these polymers is contained here.

"GR-S 2006." 3-1-54. 1 page. This sheet, covering the hot latex formerly designated X-695, is intended for insertion in the standard section to replace the blue page "X-695—Hot Latex" now found in the catalog.

"GR-I Polymers: Table I." 3-1-54. 1 page. This revised reference table covers the announced changes in the GR-I polymers listed below.

"GR-I 15, 17, 18, 25, 35, and 50." 3-1-54. 2 pages each. Current revisions of the sales information on these polymers are contained herein.

Note: The following polymers have been discontinued, and the pages describing them should be removed from the catalog: GR-S 1003, 1008, 1011, 1017, 1020, 1101, 1102, and 1103 and GR-I 16 and 40.

"Santicizer 141: The Non-Toxic Plasticizer." Technical Bulletin No. 0-89. Monsanto Chemical Co., St. Louis 1, Mo. 14 pages. This revised and expanded bulletin on the plasticizer, an alkyl aryl phosphate used for polyvinyl chloride and copolymer resins, covers physical and chemical properties of the chemical and comparative performance evaluation data, suggested formulations, and a summary of the toxicity work conducted on the material.

"Manhattan Cut-Off Wheels." Bulletin No. 6750. Raybestos-Manhattan, Inc., Passaic, N. J. 4 pages. Recommendations of wheel grade numbers for a variety of materials, operating suggestions for improved and faster metal cutting, and photos showing wheels installed on various types of machines are contained in this brochure.

"Through History with Standards." American Standards Association, Inc., 70 E. 45th St., New York 17, N. Y. 20 pages. This amusing booklet uses text and cartoons to describe some of the more interesting standards set up in the world since the Twelfth Century.

"The 36"x42" Wheelabrator Tumblast." Bulletin No. 114-B. American Wheelabrator & Equipment Corp., Mishawaka, Ind. 8 pages. Blast cleaning by airless means in a tumble-type machine, specifically the 11½-cubic foot capacity Tumblast model, is described in this publication with pictures and text. Covered are the operation, construction, specifications, and a number of case histories on specific products.

"Varisource—The All-in-One Excitation Unit." Catalog No. V3-54. Jarrell-Ash Co., Newtonville, Mass. 8 pages. Features and specifications of the de luxe, standard, and industrial models of the JAco Varisource, a unit for precision spectrochemical analysis, are covered in this brochure.

"Advantages of Dicyandiamide in Pastes and Glues." American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N. Y. 14 pages. The physical and chemical properties of Areo dicyanadiamide, used in the manufacture of resins and antioxidants, are described in this bulletin.

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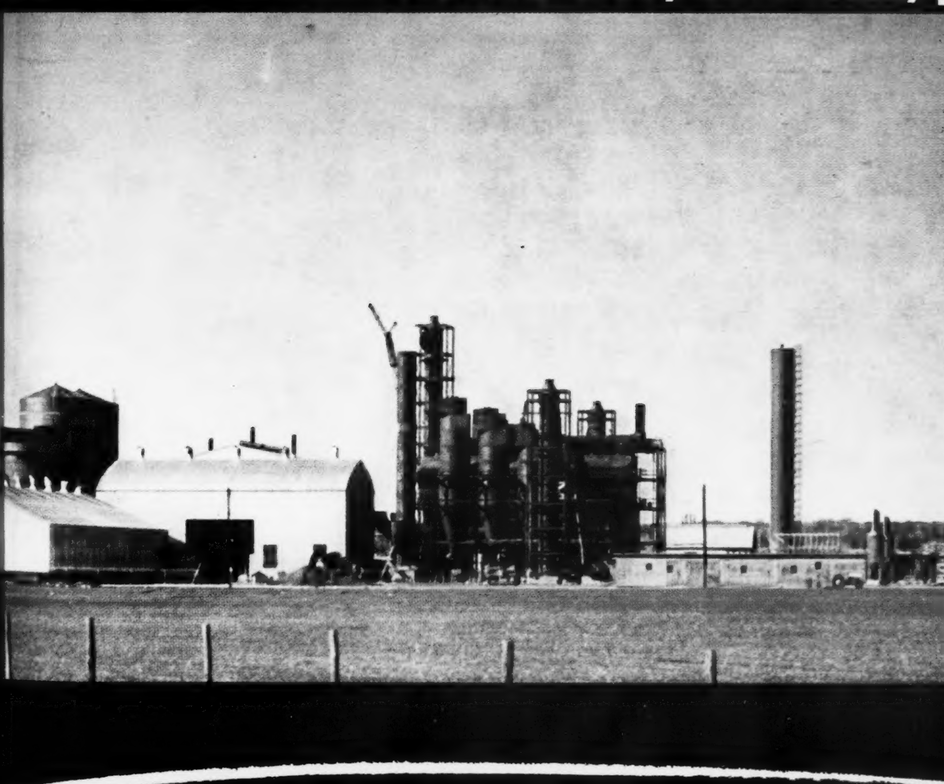

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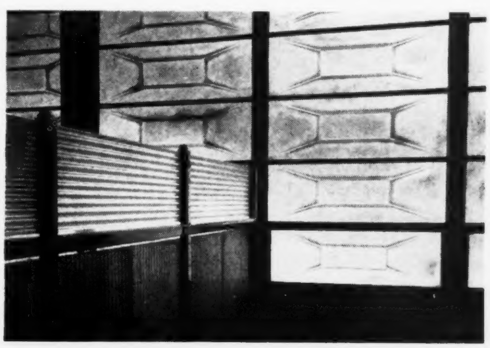
Tile Adhesive

(*Continued from page 412*)

tion is followed, and one pound of the material will accomplish the same amount of work as 40 pounds of wet mortar, according to 3M. The adhesive has a relatively long open bonding period (5-45 minutes), but painting can follow immediately after installation, and reoccupation of a room is possible within 36 hours. The final bond, reported to have a shear strength of more than 640 pounds per tile, will not become brittle with age and will retain adhesion on cracked or settling wall, the company contends.



Interior View of Reinforced Plastics Casement Windows

Polyester-Fiber Glass Windows

SHATTERPROOF translucent windows, molded of fibrous glass and Vibrin polyester resin into truncated pyramid-like shapes, are manufactured by Molded Insulation Co., Philadelphia, Pa., for use in industrial and public buildings. When installed, the windows project outward as much as 3½ inches to transmit approximately 78% of the available light in diffused, glare-free patterns.

The 1/16-inch thick fabricated plastic snaps into individual frames contained in the building structure. Outside pressures from storms have the effect of tightening the impact-resistant plastic within the frame. The finished window is water-tight and self-cleaning due to the design.

Intended as a supplement rather than as a replacement to glass, the units are light in weight (7½ ounces per square foot) and require glazing on only one side. They are manufactured in two styles: square units measuring up to three feet on each side; and casement-type units of various rectangular sizes to fit all standard casement frames.

Skylights of dome shape and containing curves to facilitate shedding to snow or rain are also made by the company of this plastic.

MARKET REVIEWS

RUBBER

FLUCTUATING prices and sensitivity to outside factors featured both the rubber physical and futures markets during the period from April 16 to May 15. Reports from Indo-China were followed closely by traders, with market prices rising as tension mounted and easing upon news of a possible settlement following the truce talks.

Reports that the United Kingdom will permit free exportation of rubber to eastern Europe also sent prices up briefly. Toward the end of the period the rubber markets displayed a cautious tone as dealers awaited the effects of the new GSA stockpile rotation program and results of the Rubber Study Group meeting in Colombo.

NEW YORK SPOT MARKET
WEEK-END CLOSING PRICES

	Mar. 27	Apr. 17	Apr. 24	May 1	May 8	May 15
R. S. S.: #1	20.50	22.00	22.25	23.00	21.88	22.25
2	20.25	21.63	21.88	22.75	21.63	22.00
3	20.13	21.13	21.38	22.63	21.50	21.88
Latex Crepe						
#1 Thick	24.50	25.38	25.50	26.50	27.25	27.75
Thin	23.25	24.75	24.88	25.50	25.25	25.63
#3 Amber Blankets	18.88	20.63	20.75	21.75	21.00	21.25
Thin Brown Crepe	17.63	19.25	19.38	20.75	19.88	20.38
Flat Bark	15.25	16.00	16.25	17.00	16.63	16.63

No. 1 Ribbed Smoked Sheets started the period at 22.00¢, rose to a high of 23.00¢ on April 26, 27, and again on April 30, dropped to a low of 21.63¢ on May 11, and closed the period at 22.25¢. Similar price movements were shown by the other grades. April monthly average spot prices for certain grades were as follows: #1 R.S.S. 22.20¢; #3 R.S.S., 21.49¢; #3 Amber Blankets, 20.80¢; Flat Bark, 15.91¢.

COMMODITY EXCHANGE
WEEK-END CLOSING PRICES

Futures	Mar. 27	Apr. 17	Apr. 24	May 1	May 8	May 15
July	20.33	22.24	22.22	22.95	22.05	22.40
Sept.	20.30	22.24	22.45	23.40	22.40	22.65
Dec.	20.39	22.64	22.90	23.90	22.95	23.25
Mar. '55	20.49	22.60	22.85	24.00	23.20	23.55
May	20.50	22.60	22.85	24.00	23.15	23.53
Total weekly sales, tons	3,570	5,250	7,950	8,920	5.320	3,850

July futures started the period at 22.55¢, advanced to a high of 23.20¢ on April 27, fell back to a low of 21.55¢ on May 11, and closed the period at 22.40¢.

Sales during the second half of April amounted to 16,870 tons, making a total for the month of 39,500 tons, the highest level since June, 1950. Sales during the first half of May totaled 9,170 tons.

Latex

DEMAND for *Hevea* latex continued quite firm during the period from April 16 to May 15, and a severe shortage in supply for the domestic market is reported through July, at least. Prices for centrifuged latex are at the 31¢ per pound (dry solids) level, and a further increase in the latex differential over dry rubber can be looked for if the Far Eastern situation continues to deteriorate.

Indications are that supplies for the second half of this year should exceed domestic consumption, but that a tight situation will prevail in 1955 when domestic consumption is expected to rise.

Prices for synthetic latices, in tank-car quantities, follow: GR-S latices, 21.5-26¢ per pound dry solids plus 1.1¢ per pound RFC uniform freight charge; nitrile latices, 47-55¢ per pound solids with minimum freight prepaid; and neoprene latices, 37-40¢ per pound solids FOB point of shipment.

Final February and preliminary March domestic statistics for natural and synthetic rubber latices follow:

(All Figures in Long Tons, Dry Weight)

	Production	Imports	Consumption	Month-End Stocks
Natural latex				
Feb.	0	5,681	5,595	12,963
Mar.*	0	6,000	6,683	12,061
GR-S latices				
Feb.	3,928	0	3,568	5,269
Mar.*	4,132	10	3,979	5,442
Neoprene latex				
Feb.	742	0	575	963
Mar.*	709	0	658	964
Nitrile latices				
Feb.	375	0	250	625
Mar.*	483	0	324	595

*Preliminary.

SCRAP RUBBER

THE scrap rubber market showed moderate activity during the period from April 16 to May 15. Good demand was noted for tube scraps, particularly black natural tubes, and fair movements were reported in tires and tire buffings. Prices for mixed auto tires in the East dropped from $11 to $9 per ton at the beginning of May, but this decline was accompanied by the major consumer dropping his stipulation that shipments contain at least 40% of truck and bus tires.

Red tube scrap declined by 0.5¢ per pound in the East, but other prices remained unchanged over the period. Export business was said to be improving, and a more optimistic feeling prevailed in the scrap market following the recent upswing in demand for reclaimed rubber

Following are dealers' selling prices for scrap rubber, in carload lots, delivered to mills at the points indicated:

	Eastern Points	Akron, O.
	(Per Net Ton)	
Mixed auto tires	$9.00	$12.00
S. A. G. auto tires	Nom.	13.00
Truck tires	Nom.	14.00
Peelings, No. 1	40.00/41.00	40.00/42.00
2	Nom.	24.00
3	15.50	Nom.
Tire buffing	18.00/20.00	16.00/17.00
	(¢ per Lb.)	
Auto tubes, mixed	2.50	2.75
Black	4.25	4.50
Red	7.50	8.00
Butyl	1.63	2.00

RECLAIMED RUBBER

THE reclaimed rubber industry reported good business during the period from April 16 to May 15, continuing the high level of activity noted during the preceding month. This pick-up in reclaim demand follows the improved business apparent in all branches of the rubber goods manufacturing industry, and the immediate outlook is for a continuation of this activity during the next few months.

Final February and preliminary March statistics on the domestic reclaimed rubber industry are now available. February figures, in long tons, were: production, 21,000; imports, 122; consumption, 19,461; exports, 941; and month-end stocks, 32,393. Preliminary statistics for March, in long tons, were: production, 23,022; imports, 94; consumption, 22,617; exports, 927; and month-end stocks, 32,649.

There were no changes in reclaimed rubber prices during the period, and current prices follow:

Reclaimed Rubber Prices

	Lb.
Whole tire: first line	$0.10
Fourth line	.0875
Inner tube: black	.15
Red	.21
Butyl	.125
Pure gum, light colored	.23
Mechanical, light colored	.135

The above list includes those items or classes only that determine the price basis of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

COTTON FABRICS

A MODERATELY good volume of business in industrial cotton fabrics was noted during the period from April 16 to May 15. Interest was centered in wide goods, including sateens and twills, but the buying pattern was still somewhat irregular and limited mainly to nearby deliveries.

Production curtailments in wide goods have resulted in a steady reduction of mill stocks. These curtailments combined with the improved outlook in the coating field are giving the fabric market a firmer tone. A tightening supply of some constructions for immediate delivery is becoming evident, and some mills recently switched their production from other types of fabrics to wide drills and twills.

Cotton Fabrics

Drills	
59-inch 1.85-yd. *yd.*	$0.3525
2.25-yd	.305
Ducks	
38-inch 1.78-yd. S. F. *yd.*	nom.
2.00-yd. D. F.	.30⅝
51.5-inch, 1.35-yd. S. F.	.46⅝
Hose and belting	.64
Osnaburgs	
40-inch 2.11-yd *yd.*	.24
3.65-yd.	.155
Raincoat Fabrics	
Printcloth, 38½-inch, 64x60 *yd.*	.13⅜/.135
Sheeting, 48-inch, 4.17-yd	.20
52-inch, 3.85-yd	.215/.22
Chafer Fabrics	
14.30-oz./sq. yd. Pl. *lb.*	.71
11.65-oz./sq. yd. S	.63
10.80-oz./sq. yd. S.	.6675
8.9-oz./sq. yd. S.	.68
Other Fabrics	
Headlining, 59-inch, 1.65-yd., 2-ply *yd.*	.465/.4675
64-inch, 1.25-yd., 2-ply	.60
Sateens, 53-inch, 1.32-yd	.54
58-inch, 1.21-yd	.59

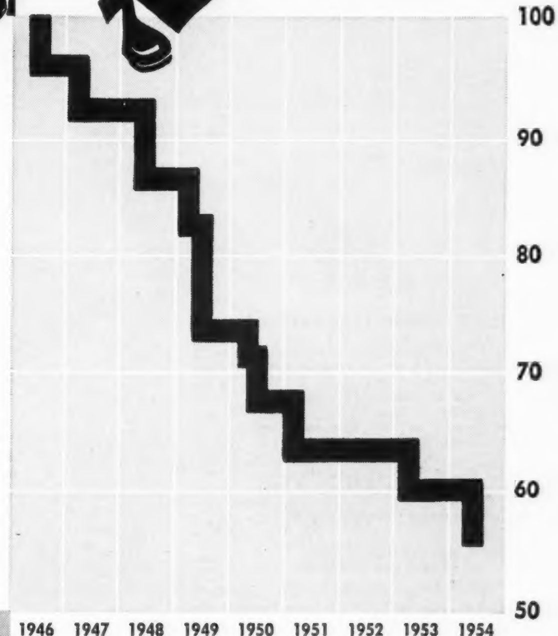
DOW CORNING ANNOUNCES *tenth* PRICE REDUCTION ON SILICONE MOLD RELEASE AGENTS

You pay less and save more with Dow Corning Mold Lubricants

Customers up from 250 in 1946 to 2000 in 1954. Quantity of Dow Corning mold release agents used in the rubber industry increased by 250%. Prices, including the most recent reduction effective April 22, have been reduced by 45% during a time when the all commodity price index showed an increase of more than 50%.

That's proof of the essential service performed by our silicone mold release agents. Eight years of experience in rubber plants all over the world has proven that Dow Corning silicone mold lubricants reduce scrap to the vanishing point; cut mold maintenance costs as much as 80%; add sales appeal by improving the appearance of finished products.

And that's why Dow Corning continues to be the first and largest supplier of silicone mold release agents; emulsions for use on molds, mandrels and curing bags; fluid for use on green carcass, bead and parting line.



PRICE INDEX OF DOW CORNING MOLD RELEASE EMULSIONS, 1946 = 100

For more information call our nearest branch office or write direct for Data Sheet M-18

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RAYON

RAYON shipments by domestic producers during April amounted to 90,600,000 pounds, about equal to those of the preceding month. Total production in April was 85,200,000 pounds, somewhat below the March level, and month-end stocks were 98,300,000 pounds, or 5% below March 31 stocks. April figures for viscose high-tenacity rayon yarn were as follows: production, 27,600,000 pounds (about 15% below March output); total shipments, 30,400,000 pounds (6% below March shipments); and month-end stocks, 13,000,000 pounds (about 20% below the March figure and the lowest level since May, 1951).

Shipments of rayon yarn for use in tires and related products amounted to 90,700,000 pounds during the first quarter of this year, as compared to the average quarterly figure of 109,900,000 pounds last year. This reduction is explained as being due to seasonal factors which reduced demand from the consumers and not to any substitution of cotton for rayon cords. The average denier of rayon tire yarn shipped during the first quarter was 1,604, as compared with the 1953 average of 1,587 denier.

No changes were made in rayon tire yarn and fabric prices during the period from April 16 to May 15, and current prices follow:

Rayon Prices

Tire Yarns		
1100/480	$0.26	$0.63
1100/490		.62
1150/490		.62
1165/480		.63
1650/720		.61
*1650/980		.61
1820/980		.61
2200/960		.60
2200/980		.60
2200/1466		.67
4400/2934		.63
Tire Fabrics		
1100/490/2		.72
1650/980/2	.659	.73
2200/980/2		.685

Foreign Trade Opportunities

The firms and industries listed below recently expressed their interest in buying in the United States or in United States representations. Additional information concerning each import or export opportunity, is available to qualified United States firms and may be obtained upon inquiry from the Commercial Intelligence Unit of the United States Department of Commerce, Washington, D. C., or through its field offices, for $1 each. Interested United States companies should correspond directly with the concerns listed concerning any projected business arrangements.

Export Opportunities

"ADESCO," Ernesto Adler & Co., Apartado 1941, Oficina 25, Edificio Blohm, Corazon de Jesus, Caracas, Venezuela: play balls, balloons, rubber toys, rubber mats, and workers' rubber boots.

Joseph Braddell & Son, Ltd., Mayfair, Arthur Square, Belfast, Northern Ireland: full thigh-length rubber waders, laced at instep and with suspender at calf.

Goudeket & Co., 151 Oude Zijds Voorburgwal, Amsterdam, Netherlands: chemicals and mineral raw materials for the rubber, latex, plastic, and textile industries.

Bromfield Agencies, Room 16, Coronation Bldg., Tower St., Kingston, Jamaica, British West Indies: medium- and low-quality raw materials for the rubber footwear manufacturing industry.

C. Plasterek, Calle E Numero 406, Vedado, (P. O. Box 2833), Havana, Cuba: rubber and plastic covered copper wire, flexible conduits, etc.

Riccardo Steinleitner, 1 Via S. Antonio da Padova, Turin, Italy: raw materials for the iindustry.

Ernst Schultes, 42 Neubauguertel, Vienna VII, Austria: plastic materials.

Mohamed & A. Sons of Awad Bin Ladin, Jidda, Saudi Arabia: automotive spare parts, batteries, tires, tubes, electric cables and accessories.

Cherbar Agencies, P. O. Box 18, Brakpan, Transvaal, Union of South Africa: stationers' rubber goods.

Sabenca, C. A. Industrial y Comercial Venezolana, Apartado 4770, No. 49 Candilitos a Avilanes, Caracas, Venezuela: athletic equipment for baseball, tennis, soccer, etc.

Etablissements Sphynx, 73-75 Rue Pierre De Coster, Brussels, Belgium: toys.

Societe de Pavage & Asphaltes du Sud-Ouest, 8 Rue Sarrette, Bordeaux, Gironde, France: vinyl coating resins and coumarone-indene resins.

Import Opportunities

Faustino Giani, 2-17 Corso Perrone, Genoa-Cornigliano, Italy: rubber molds for the production of statuettes in alabaster and plaster of paris.

Chemieprodukte G.m.b.H., 4 Am Hofacker, Leverkusen-Rheindorf, Germany; corrosion-resistant insulation and sealing materials.

Heinrich Ritter, representing Heinrich Ritter, Aluminiumwarenfabrik, 32 Ulmerstrasse, Esslingen/Neckar, Wuerttemberg, Germany: thermoplastics.

Skogens Kol Aktiebolag, Kilafors, Sweden: "Sibocon" rubber softener.

Tonichi Corp., Room No. 436, Marunouchi Bldg., Chiyoda-ku, Tokyo, Japan: V-, flat, and conveyor belts, rubber thread.

Les Corsets Sirene, 13 Rue des Petits Hotels, Paris, France: rubber corsets and girdles, bathing suits, etc.

Carbon Black Statistics — First Quarter, 1954

Below are statistics for output, shipments, producers' stocks, and exports of carbon black for the first quarter, 1954. Furnace blacks are classified as follows: SRF, semi-reinforcing furnace black; HMF, high modulus furnace black; FEF, fast extruding furnace black; and HAF, high abrasion furnace black.

(Thousands of Pounds)

	Jan.	Feb.	Mar.
Production			
Furnace types			
Thermal	6,923	6,059	8,202
SRF	23,932	22,016	22,165
HMF	7,321	6,588	8,604
FEF	13,515	10,431	13,257
HAF	32,871	29,881	38,163
Total	84,562	74,975	90,391
Contact types	32,467	29,119	33,063
TOTALS	117,029	104,094	123,454
Shipments			
Furnace types			
Thermal	7,950	7,489	8,796
SRF	20,142	21,263	23,376
HMF	8,398	8,377	8,722
FEF	13,673	13,252	15,753
HAF	32,788	32,963	34,364
Total	82,951	83,344	91,011
Contact types	32,988	30,488	33,612
TOTALS	115,939	113,832	124,623
Producers' Stocks, End of Period			
Furnace types			
Thermal	11,253	9,823	9,229
SRF	33,503	34,256	33,045
HMF	26,337	24,548	24,430
FEF	37,719	34,898	32,402
HAF	63,497	60,415	64,214
Total	172,309	163,940	163,320
Contact types	233,195	231,826	231,277
TOTALS	405,504	395,766	394,597
Exports			
Furnace types	13,933	14,888	15,125
Contact types	15,996	16,424	13,629
TOTALS	29,989	31,312	28,755

SOURCE: Bureau of Mines, United States Department of the Interior, Washington 25, D. C.

Trade Lists Available

The Commerical Intelligence Division recently published the following trade lists, of which mimeographed copies may be obtained by firms domiciled in the United States from this Division and from United States Department of Commerce Field Offices. The price is $1 a list for each country.

Aircraft & Aeronautical Supply & Equipment Importers & Dealers: Mexico.

Automotive Product Manufacturers: Malaya.

Automotive Vehicle & Equipment Importers & Dealers: Bolivia; Cuba; Hong Kong.

Chemical Importers & Dealers: Malaya.

Dental Supply Houses: Australia.

Electrical Equipment Importers & Dealers: Malaya.

Sporting Goods Toy & Game Importers & Dealers: Hong Kong.

Electrical Supply & Equipment Importers & Dealers: Iran; Peru.

Office Supply & Equipment Importers & Dealers: Angola; Finland; Luxembourg; Union of South Africa.

U. S. Rubber Industry Employment, Wages, Hours

	Prod. Workers 1000's	Ave. Week Earnings	Ave. Week Hrs.	Ave. Hour Earnings	Consumers Price Index
All Rubber Products					
1939	121	$27.84	39.9	$0.75	——
1949	186	57.79	38.3	1.51	101.8
1950	203	64.42	40.9	1.58	102.8
1951	212	68.61	40.6	1.69	111.0
1952	208.2	74.78	40.7	1.83	113.5
1953					
Jan.	219.2	78.09	41.1	1.90	113.9
Feb.	219.2	79.30	41.3	1.92	113.4
Mar.	220.5	80.29	41.6	1.93	113.6
Apr.	220.5	79.32	41.1	1.93	113.7
May	220.2	78.18	40.3	1.94	114.0
June	220.3	78.55	40.7	1.93	114.5
July	213.2	78.98	40.5	1.95	114.7
Aug.	214.4	76.81	39.8	1.93	115.0
Sept.	214.2	74.88	39.0	1.92	115.2
Oct.	209.2	75.07	39.1	1.92	115.4
Nov.	203.8	75.65	39.4	1.92	115.0
Dec.	202.3	75.66	39.2	1.93	114.9
Tires and Tubes					
1939	54.2	$33.36	35.0	$0.96	
1949	83.6	63.26	36.4	1.74	
1950	87.8	72.48	39.8	1.82	
1951	87.4	78.01	39.6	1.97	
1952	90.8	85.65	40.4	2.12	
1953					
Jan.	91.5	89.24	40.2	2.22	
Feb.	91.2	91.80	40.8	2.25	
Mar.	91.6	93.83	41.7	2.25	
Apr.	92.2	91.58	40.7	2.25	
May	92.7	91.30	40.4	2.26	
June	92.4	89.20	40.0	2.23	
July	90.1	90.45	40.2	2.25	
Aug.	89.6	87.58	39.1	2.24	
Sept.	89.6	83.54	37.8	2.21	
Oct.	86.6	83.16	37.8	2.20	
Nov.	83.7	85.09	38.5	2.21	
Dec.	82.9	82.43	37.3	2.21	
Rubber Footwear					
1939	14.8	$22.80	37.5	$0.61	
1949	21.6	48.94	38.6	1.27	
1950	20.6	52.21	40.1	1.30	
1951	23.9	57.81	41.0	1.41	
1952	22.9	62.22	40.4	1.54	
1953					
Jan.	24.5	64.96	40.1	1.62	
Feb.	24.2	67.57	41.2	1.64	
Mar.	24.2	67.57	41.2	1.64	
Apr.	23.8	67.82	41.1	1.65	
May	23.3	60.31	37.0	1.63	
June	23.5	68.06	41.0	1.66	
July	22.5	68.64	41.1	1.67	
Aug.	23.6	65.53	40.2	1.63	
Sept.	24.1	64.24	39.9	1.61	
Oct.	24.0	62.86	38.8	1.62	
Nov.	23.7	63.57	39.0	1.63	
Dec.	22.9	65.44	39.9	1.64	
Other Rubber Products					
1939	51.9	$23.34	38.9	$0.61	
1949	80.9	54.38	40.1	1.36	
1950	94.3	59.76	42.2	1.42	
1951	100.7	63.19	41.3	1.53	
1952	94.6	66.58	41.1	1.62	
1953					
Jan.	103.2	71.74	42.2	1.70	
Feb.	103.8	71.06	41.8	1.70	
Mar.	104.7	71.72	41.7	1.72	
Apr.	104.5	71.21	41.4	1.72	
May	104.2	70.93	41.0	1.73	
June	104.4	71.28	41.2	1.73	
July	100.6	70.64	40.6	1.74	
Aug.	101.2	70.30	40.4	1.74	
Sept.	100.5	69.65	39.8	1.75	
Oct.	98.6	70.70	40.4	1.75	
Nov.	96.4	70.53	40.3	1.75	
Dec.	96.5	72.45	40.7	1.78	

SOURCE: BLS, United States Department of Labor, Washington, D. C.

COMPOUNDING INGREDIENTS*

Abrasives

Pumicestone, powdered	lb.	$0.025 /	$0.045
Rottenstone, domestic	lb.	.03 /	.04

Accelerators, Organic

A-10	lb.	.40 /	.47
A-19	lb.	.52 /	.58
A-32	lb.	.66 /	.80
A-77	lb.	.47 /	.60
A-100	lb.	.52 /	.66
Accelerator 49	lb.	.53 /	.54
552	lb.	2.25	
808	lb.	.66 /	.68
833	lb.	1.17 /	1.19
Altax	lb.	.48 /	.525
Arazate	lb.	.66 /	.71
Beutene	lb.	.61 /	.66
Bismate	lb.	3.00	
B-J-F	lb.	.27 /	.32
Butasan	lb.	1.04	
Butazate	lb.	1.04	
Butyl Accelerator 21	lb.	.89	
Eight	lb.	1.10 /	1.35
Zimate	lb.	1.04	
Captax	lb.	.38 /	.40
C-P-B	lb.	1.95	
Cumate	lb.	1.45	
Diesterex N	lb.	.50 /	.57
DOTG (diorthotolylguanidine)	lb.	.57 /	.58
DGP (diphenylguanidine)	lb.	.48 /	.55
El-Sixty	lb.	.50 /	.57
Ethasan	lb.	1.04	
Ethazate	lb.	1.04	
Ethyl Thiurad	lb.	1.04	
Tuads	lb.	1.04	
Tuex	lb.	1.04	
Zimate	lb.	1.04	
Ethylac	lb.	.93 /	.95
Hepteen	lb.	.44 /	.50
Base	lb.	1.85	
Ledate	lb.	1.04	
M-B-T	lb.	.38 /	.43
-XXX	lb.	.49 /	.51
M-B-T-S	lb.	.48 /	.53
-W	lb.	.53 /	.55
Merac	lb.	.75 /	1.05
Mertax	lb.	.49 /	.56
Methasan	lb.	1.04	
Methazate	lb.	1.04	
Methyl Tuads	lb.	1.14	
Zimate	lb.	1.04	
Monex	lb.	1.14	
Mono-Thiurad	lb.	1.14	
Morfex	lb.	.65 /	.70
NOBS No. 1	lb.	.69 /	.71
O-X-A-F	lb.	.49 /	.54
Pentex	lb.	1.04	
Flour	lb.	.21	
Permalux	lb.	2.17	
Phenex	lb.	.52 /	.59
Pip-Pip	lb.	2.07	
R-2 Crystals	lb.	2.45	
Rotax	lb.	.49 /	.51
RZ-50, -50B	lb.	1.00	
S. A. 52	lb.	1.14	
57, 62, 67, 77	lb.	1.04	
66	lb.	2.50	
Santocure	lb.	.69 /	.76
Selenac	lb.	2.50	
Setsit No. 5	lb.	.75 /	1.05
SPDX-GH	lb.	.64 /	.69
GL	lb.	.95	
Tellurac	lb.	1.45	
Tepidone	lb.	.45 /	.48
Tetrone A	lb.	1.91	
Thiocarbanilide (A-1)	lb.	.50 /	.57
Thiofide	lb.	.48 /	.55
S	lb.	.51 /	.58
Thionex	lb.	1.14	
Thietax	lb.	.38 /	.45
Thiurad	lb.	1.14	
Thiuram E	lb.	1.04	
M	lb.	1.14	
Trimene	lb.	.56 /	.62
Base	lb.	1.03 /	1.10
Tuads	lb.	1.14	
Tuex	lb.	1.14	
Ultex	lb.	1.00 /	1.10
Unads	lb.	1.14	
Ureka Base	lb.	.66 /	.73
Vulcacure NB	lb.	.45	
ZB, ZE, ZM	lb.	.85	
Z-B-X	lb.	2.45	
Zenite	lb.	.48 /	.50
A	lb.	.57 /	.59
Special	lb.	.49 /	.51
Zetax	lb.	.49 /	.51
Zimate	lb.	1.04	

Accelerator-Activators, Inorganic

Lime, hydrated	ton	10.00 /	17.50
Litharge, comml	lb.	.16 /	.165
Eagle, sublimed	lb.	.16 /	.161
Red Lead, comml.	lb.	.1625/	.1775
Eagle	lb.	.17	
White lead, basic	lb.	.165 /	.175
Eagle	lb.	.165 /	.175
White lead, silicate	lb.	.155 /	.1875
Eagle	lb.	.175 /	.1925
Zinc oxide, comml.†	lb.	.135 /	.1675

Accelerator-Activators, Organic

Aktone	lb.	$0.22 /	$0.23
Barak	lb.	.62	
Curade	lb.	.57 /	.59
D-B-A	lb.	1.95	
Delac P	lb.	.45 /	.52
Emersol 110	lb.	.13 /	.155
120	lb.	.135 /	.16
130	lb.	.1575/	.1825
210 Elaine	lb.	.1475/	.1775
Emery 600	lb.	.1125/	.1475
Groco 30	lb.	.095 /	.13
35	lb.	.10 /	.135
53	lb.	.1375/	.155
54	lb.	.1425/	.16
55	lb.	.165 /	.1825
Rubber grade hydrogenated stearic acid	lb.	.1075/	.125
Guantal	lb.	.57 /	.64
Hyfac 400	lb.	.10 /	.125
430	lb.	.1475/	.1725
431	lb.	.17 /	.195
Laurex	lb.	.30 /	.33
MODX	lb.	.295 /	.345
NA-22	lb.	1.50	
Plastone	lb.	.27 /	.30
Polvac	lb.	1.65	
Seedine	lb.	.1485/	.1705
Stearex Beads	lb.	.14⅞/	.15⅞
Stearic acid, single pressed	lb.	.1375/	.1625
Double pressed	lb.	.1425/	.1675
Triple pressed	lb.	.165 /	.19
Tonox	lb.	.515 /	.605
Vulklor	lb.	.75 /	.95
Zinc stearate	lb.	.37 /	.42

Alkalies

Caustic soda, flake	100 lbs.	4.10 /	5.30
Liquid, 50%	100 lbs.	2.55 /	2.75
Solid	100 lbs.	3.70 /	4.90

Antioxidants

AgeRite Alba	lb.	2.35 /	2.45
Gel	lb.	.64 /	.66
H. P.	lb.	.72 /	.74
Hipar	lb.	.98 /	1.00
Powder	lb.	.52 /	.54
Resin	lb.	.75 /	.77
D	lb.	.52 /	.54
Spar	lb.	.52 /	.54
Stalite	lb.	.52 /	.54
White	lb.	1.45 /	1.55
Akroflex C	lb.	.72 /	.79
CD	lb.	.72 /	.74
Albasan	lb.	.69 /	.73
Aminox	lb.	.52 /	.57
Antioxidant 2246	lb.	1.65 /	1.68
Antisol	lb.	.23 /	.24
Antox	lb.	.52 /	.54
Aranox	lb.	3.25	
Betanox Special	lb.	.80 /	.85
B-L-E, -25	lb.	.52 /	.57
Burgess Antisun Wax	lb.	.185	
B-X-A	lb.	.52 /	.57
Copper Inhibiter X-872-L	lb.	2.01	
Flectol H	lb.	.52 /	.59
Flexamine	lb.	.72 /	.77
Heliozone	lb.	.26 /	.27
Ionol	lb.	.91 /	1.40
NBC	lb.	1.55	
Neozone A	lb.	.56 /	.58
D	lb.	.52 /	.54
Octamine	lb.	.52 /	.57
Perflectol	lb.	.61 /	.68
Polygard	lb.	.52 /	.57
Rio Resin	lb.	.60 /	.62
Santoflex 35	lb.	.72 /	.79
AW	lb.	.78 /	.85
B	lb.	.52 /	.59
BX	lb.	.63 /	.70
Santovar A	lb.	1.50 /	1.57
O	lb.	1.30 /	1.37
Santowhite Crystals	lb.	1.60 /	1.67
L	lb.	.52 /	.59
MK	lb.	1.29 /	1.36
Sharples Wax	lb.	.23 /	.28
Stabilite	lb.	.55 /	.59
Alba	lb.	.72 /	.79
L	lb.	.60 /	.64
White	lb.	.53 /	.62
Powder	lb.	.41 /	.47
Styphen I	lb.	.51 /	.55
Sunolite #100	lb.	.21 /	.23
#127	lb.	.17 /	.19
Sunproof -713	lb.	.25 /	.30
Improved	lb.	.25 /	.30
Jr.	lb.	.20 /	.25
Thermoflex A	lb.	.98 /	1.00
Tonox	lb.	.52 /	.57
Tysonite	lb.	.24 /	.2475
V-G-B	lb.	.70 /	.75
Wing-Stay S	lb.	.52 /	.61
Zenite	lb.	.33 /	.35

Antiseptics

Copper naphthenate, 6-8%	lb.	.235	
Pentachlorophenol	lb.	.21 /	.29
Resorcinol, technical	lb.	.775 /	.785
Zinc naphthenate, 8-10%	lb.	.245 /	.30

Blowing Agents

Ammonium, bicarbonate	lb.	.065 /	.075
Carbonate	lb.	.23 /	.24
Blowing Agent CP- 975	lb.	$0.35	
Celogen	lb.	1.95	
50-C	lb.	1.01 /	$1.07
Sodium bicarbonate	100 lbs.	2.30 /	3.70
Carbonate, tech.	100 lbs.	1.35 /	5.02
Sponge Paste	lb.	.20	
Unicel	lb.	.90	
ND	lb.	.79	
S	lb.	.20	

Bonding Agents

G-E Silicone Paste SS-15	lb.	4.52 /	5.10
SS-64	lb.	3.65 /	6.75
-67 Primer	lb.	7.50 /	12.50
Gen-Tac Latex	lb.	.75 /	.855
Kalabond Adhesive	gal.	6.50 /	16.00
Tie Cement	gal.	2.00 /	5.60
MDI	lb.	4.00 /	6.00
-50	lb.	2.00 /	3.00
Thixons	gal.	1.48 /	12.00
Ty Ply BN, Q, S, 3640	gal.	6.75 /	8.00

Brake Lining Saturants

BRT 3	lb.	.018 /	.0265
Resinex L-S	lb.	.0225/	.03

Carbon Blacks‡

Conductive Channel—CC

Continental R-40	lb.	.23 /	.30
Kosmos/Dixie BB	lb.	.23 /	.30
Spheron C	lb.	.14 /	.185
Voltex	lb.	.18 /	.315

Easy Processing Channel—EPC

Continental AA	lb.	.074 /	.1225
Kosmobile 77/Dixiedensed 77	lb.	.074 /	.1225
Micronex W-6	lb.	.074 /	.1225
Spheron #9	lb.	.074 /	.1225
Texas E	lb.	.074 /	.1175
Witco #12	lb.	.074 /	.1225
Wyex	lb.	.074 /	.12

Hard Processing Channel—HPC

Continental F	lb.	.074 /	.1225
HX	lb.	.074 /	.12
Kosmobile S/Dixiedensed S	lb.	.074 /	.1225
Micronex Mk. II	lb.	.074 /	.1225
Spheron #4	lb.	.074 /	.1225
Witco #6	lb.	.074 /	.1225

Medium Processing Channel—MPC

Arrow TX	lb.	.074 /	.12
Continental A	lb.	.074 /	.1225
Kosmobile S-66/Dixiedensed S-66	lb.	.074 /	.1225
Micronex Standard	lb.	.074 /	.1225
Spheron #6	lb.	.074 /	.1225
Texas M	lb.	.074 /	.1175
Witco #1	lb.	.074 /	.1225

Conductive Furnace—CF

Aromex 115	lb.	.089 /	.129
Vulcan C	lb.	.11 /	.153
SC	lb.	.18 /	.223

Fast Extruding Furnace—FEF

Arovel	lb.	.06 /	.10
Continex FEF	lb.	.06 /	.10
Kosmos 50/Dixie 50	lb.	.06 /	.10
Statex M	lb.	.06 /	.10
Sterling SO	lb.	.06 /	.10

Fine Furnace—FF

Statex B	lb.	.065 /	.105
Sterling 99	lb.	.065 /	.105

High Abrasion Furnace—HAF

Aromex	lb.	.079 /	.125
Continex HAF	lb.	.079 /	.125
Kosmos 60/Dixie 60	lb.	.079 /	.1175
Philblack O	lb.	.079 /	.119
Statex R	lb.	.079 /	.125
Vulcan #3	lb.	.079 /	.122

Medium Abrasion Furnace—MAF

Philblack A	lb.	.06 /	.10

Super Abrasion Furnace—SAF

Kosmos 70/Dixie	lb.	.11 /	.155
Philblack E	lb.	.135 /	.175
I	lb.	.11 /	.15
Statex 125	lb.	.11 /	.155
Vulcan 6	lb.	.11 /	.153
9	lb.	.135 /	.178

General-Purpose Furnace—GPF

Sterling V	lb.	.05 /	.09

*Prices in general are f.o.b. works. Range indicates grade or quantity variations. Space limitation prevents listing of all known ingredients. Prices are not guaranteed; contact suppliers for spot prices.

†For trade names, see Color—White, Zinc Oxides.

‡At the request of the suppliers, the lowest prices shown for carbon blacks are for carloads in bags. Prices for hopper carloads are lower.

High Modulus Furnace—HMF

Continex HMF	lb.	$0.055	$0.095
Kosmos 40/Dixie 40	lb.	.055	.095
Modulex	lb.	.055	.095
Statex 93	lb.	.055	.095
930	lb.	.047	.087
Sterling L, LL	lb.	.055	.095

Semi-Reinforcing Furnace—SRF

Continex SRF	lb.	.045	.085
Essex	lb.	.045	.085
Furnex	lb.	.045	.085
Gastex	lb.	.05	.09
Kosmos 20/Dixie 20	lb.	.045	.085
Pelletex, NS	lb.	.045	.085
Sterling NS, S	lb.	.045	.085
R	lb.	.05	.09

Fine Thermal—FT

P-33	lb.	.055	
Sterling FT	lb.	.055	

Medium Thermal—MT

Sterling MT	lb.	.035	
Non-staining	lb.	.045	
Thermax	lb.	.035	
Stainless	lb.	.045	

Chemical Stabilizers

Argus stabilizers	lb.	.60	1.38
Dutch Boy DS-207	lb.	.53	.55
Dyphos	lb.	.56	.58
Dythal	lb.	.40	.42
Normasal	lb.	.45	.47
Plumb-O-Sil A	lb.	.2875	.3075
B	lb.	.3025	.3225
C	lb.	.3325	.3525
Tribase	lb.	.265	.285
E	lb.	.235	.255
Eagle Basic Silicate White			
Lead 201	lb.	.1825	.1925
202	lb.	.175	.185
Stabelans	lb.	.60	1.70
Staycin 1	lb.	.65	
Vanstay HT	lb.	.90	.92
HTR	lb.	1.20	1.22
L	lb.	.33	.35
S	lb.	.65	.70
Witco Lead Stearate #30	lb.	.32	.37
P-30	lb.	.39	.44
Stayrite #10	lb.	.32	.37
P-10	lb.	.39	.44
#15	lb.	.53	.57
#20	lb.	.37	.42
#22	lb.	1.40	1.44
#25	lb.	.35	.40
#70, 80, 90	lb.	.70	

Colors

Black

Black Paste #25	lb.	.22	.40
BK Iron Oxides	lb.	.1275	.13
Covinylblaks	lb.	.68	.145
Ivo Bone Blacks	lb.	.15	.2025
Lampblack, comml.	lb.	.16	.45
Superjet	lb.	.0825	.1175
Mapico	lb.	.1275	.13
MB Mineral Blacks	lb.	.0315	.0675
Stan-Tone	lb.	.45	1.20

Blue

Du Pont	lb.	1.77	4.55
Heveatex pastes	lb.	.80	1.45
Stan-Tone	lb.	1.55	1.60
Toners	lb.	.30	3.50

Brown

Brown Paste #5, #10	lb.	.35	.45
Mapico	lb.	.1375	.205
Tan	lb.	.1975	.20
Metallic brown	lb.	.04	.05
Plastics brown	lb.	.0625	.07
Sienna, burnt	lb.	.0425	.155
Raw	lb.	.045	.1325
Umber, burnt	lb.	.06	.07
Raw	lb.	.0625	.07

Green

Chrome	lb.	.19	.50
Oxide	lb.	.3925	1.10
Du Pont	lb.	1.97	3.20
G-4099, -6099	lb.	.3925	.3975
GH-9869	lb.	1.00	1.15
9976	lb.	1.10	1.25
Heveatex pastes	lb.	.95	1.85
Stan-Tone	lb.	1.75	4.60
Toners	lb.	.35	4.00

Orange

Du Pont	lb.	2.75	
Orange Paste #13	lb.	1.35	1.50
Stan-Tone	lb.	.70	3.35
Toners	lb.	.30	1.50

Red

Antimony trisulfide	lb.	.27	.30
R. M. P. No. 3	lb.	.72	
Sulfur Free	lb.	.78	
Cadmium red lithopone	lb.	1.64	2.05
Cadmolith	lb.	1.72	2.05
Du Pont	lb.	1.47	1.80
Indian Red	lb.	.1275	
Iron oxide, red	lb.	.06	.13
Mapico	lb.	.1275	.13
Red Paste #17, I-2	lb.	.95	1.10
Rub-Er-Red	lb.	.0975	
Stan-Tone	lb.	1.05	4.05
Toners	lb.	.25	4.15

White

Antimony oxide	lb.	$0.26	$0.275
Burgess Iceberg	ton	50.00	
Lithopone, titanated	lb.	.10	.11
Cryptone BT	lb.	.10	.11
Titanium pigments			
Rayox LW	lb.	.195	.205
R-110	lb.	.215	.225
Ti-Cal	lb.	.075	.0825
Ti-Pure	lb.	.195	.225
Titanox A, AA, A-168	lb.	.21	.22
C-50	lb.	.1225	.1275
RA, -10, -50	lb.	.23	.24
RC	lb.	.0825	.0875
-HT, -HTX	lb.	.08	.085
Zopaque	lb.	.21	.22
Zinc oxide, comml.	lb.	.135	.1675
Azo ZZZ-11, -44, -55	lb.	.135	.145
20% leaded	lb.	.1375	.1475
35% leaded	lb.	.14	.15
50% leaded	lb.	.14⅛	.15⅛
Eagle AAA, lead free	lb.	.135	.145
5% leaded	lb.	.135	.145
35% leaded	lb.	.14	.15
50% leaded	lb.	.14⅛	.15⅛
Florence Green Seal	lb.	.1525	.1625
Red Seal	lb.	.1475	.1575
White Seal	lb.	.1575	.1675
Horsehead XX-4, -78	lb.	.135	.145
Kadox -15, -17, -22	lb.	.135	.145
-25	lb.	.1575	.1675
Lehigh, 35% leaded	lb.	.14	.15
50% leaded	lb.	.14⅛	.15⅛
Protox-166, -167	lb.	.135	.145
St. Joe, lead free	lb.	.135	.145
Zinc sulfide, comml.	lb.	.253	.263
Cryptone ZS	lb.	.253	.263

Yellow

Cadmium yellow lithopone	lb.	1.15	1.16
Cadmolith	lb.	1.29	1.37
Chrome	lb.	.31	.33
Du Pont	lb.	1.80	2.15
Iron oxide, yellow	lb.	.038	.1075
Mapico	lb.	.105	.1075
Stan-Tone	lb.	1.00	1.55
Toners	lb.	.50	1.37
Yellow D	lb.	1.25	1.35

Dispersing Agents

Darvan Nos. 1, 2, 3	lb.	.22	.30
Kreelons	lb.	.15	.16
Modicols	lb.	.17	.58
Triton R-100	lb.	.12	.25

Dusting Agents

Extrud-o-Lube, conc.	gal.	1.54	1.69
Glycerized Liquid Lubricant, concentrated	gal.	1.48	1.63
Latex-Lube GR	lb.	.20	
Pigmented	lb.	.1825	
R-66	lb.	.165	
Liqui-Lube	lb.	.1625	
N. T.	lb.	.1675	
Liquizinc No. 305	lb.	.30	.35
Lubrex	lb.	.25	.30
Mica	lb.	.075	.085
Pyrax A	ton	13.50	
W. A.	ton	16.00	
Snow Crest Talc	ton	33.00	35.00
Vanfre	gal.	2.00	2.50

Extenders

BRS 700	lb.	.02	.0285
BRT 7	lb.	.03	.031
Burgess MX-50	ton	150.00	
Car-Bel-Ex A	lb.	.14	
Dielex B	lb.	.06	
Factice, Amberex	lb.	.29	.36
Brown	lb.	.1425	.268
Neophax	lb.	.157	.268
White	lb.	.144	.285
Mineral Rubbers			
Black Diamond	ton	38.00	40.00
Extender 600	lb.	.185	
Hard Hydrocarbon	ton	46.50	48.50
Hydrocarbon MR	ton	45.00	55.00
Parmr	ton	21.00	29.00
T-MR Granulated	ton	47.50	50.00
Nuba No. 1, 2	lb.	.0575	.0625
3X	lb.	.0775	.0825
Rubber substitute, brown	lb.	.137	.2625
White	lb.	.156	.292
Stan-Shells	ton	35.00	73.00
Synthetic 100	lb.	.41	

Fillers, Inert

Barytes, floated, white	ton	41.60	60.10
Off-color, domestic	ton	25.00	
No. 1	ton	41.35	60.10
2	ton	39.35	58.00
Sparmite	ton	75.00	80.00
Blanc fixe	ton	100.00	165.00
Clays			
Aiken	ton	14.00	
Albacar	ton	50.00	55.00
Aluminum Flake	ton	20.00	60.00
#5	ton	23.50	26.50
Champion	ton	14.00	
Crown	ton	14.00	33.00
GK Soft Clay	ton	11.00	
Hi-White R	ton	13.50	
Hydratex R	ton	28.00	
Paragon	ton	13.50	31.50
McNamee	ton	$13.50	
RX-43	ton	33.00	
Stan-Clay	ton	28.00	
Stellar-R	ton	50.00	
Suprex	ton	14.00	$32.00
W-1291 English	ton	53.00	55.00
Witco #1	ton	14.00	30.00
#2	ton	13.50	30.00
Cryptone BA, CB, MS	lb.	.08	.0825
Flocks			
Cotton, dark	lb.	.095	.112
Dyed	lb.	.55	.60
White	lb.	.13	.33
Fabrifil X-24-G	lb.	0.095	
X-24-W	lb.	.135	
Filfloc 6000	lb.	.16	
F-40-900	lb.	.105	
Kalite	ton	50.00	65.00
Lithopone, comml.	lb.	.075	.085
Albalith	lb.	.075	.085
Astrolith	lb.	.06¾	.0675
Eagle	lb.	.0725	.075
Sunolith	lb.	.079	.089
Mica	lb.	.075	.085
Millical	ton	35.00	50.00
No. 1 Silica	ton	22.00	40.00
Non-Fer-Al	ton	30.00	45.00
Pyrax A	ton	12.50	
W. A.	ton	15.00	
SL Slate Flour	ton	17.00	25.00
Stan-White	ton	8.50	9.45
Super-White Silica	ton	23.00	43.00
Suspenso	ton	33.00	48.00
Terra Alba 1319	ton	27.00	
Ti-Cal	lb.	.0675	
Whiting, limestone	ton	32.00	34.00
Calcite	ton	21.50	
Paxinosa	ton	10.00	18.00
Witco	ton	8.50	

Finishes

Black-out	gal.	4.50	8.00
Flocks			
Cotton, dark	lb.	.095	.112
Dyed	lb.	.55	.60
White	lb.	.13	.33
Rayon, colored	lb.	.90	1.50
White	lb.	.75	1.25
Rubber lacquer, clear	gal.	1.00	2.00
Colored	gal.	2.00	3.50
Shoe varnish	gal.	1.45	
Talc	ton	14.00	38.50
Nytals	ton	25.00	36.00
Wax, Bees	lb.	.54	.75
Carnauba	lb.	.80	.86
Montan	lb.	.135	.32
No. 118, colors	gal.	.86	1.41
Neutral	gal.	.76	1.31
Van Wax	gal.	1.45	1.50

Latex Compounding Ingredients

Accelerator 552	lb.	2.25	
J-117, -302	lb.	1.00	1.15
-144	lb.	.15	.30
-307	lb.	1.10	1.25
-311	lb.	.60	.75
Aerosol	lb.	.35	
AgeRite Dispersions	lb.	.60	2.25
Alcogum AN-6	lb.	.05	
AN-10	lb.	.085	
Amberex Solutions	lb.	.1675	.18
Antifoam J-114	lb.	3.25	3.45
P-242	lb.	.24	.35
Antioxidant J-137, -140	lb.	.55	.70
-139, -293	lb.	1.45	1.60
-182	lb.	2.00	2.15
-186	lb.	1.40	1.55
Anti-Webbing Agent J-183	lb.	.75	.90
-297	lb.	.27	.40
Aquablaks	lb.	.085	.1775
Aquarex D	lb.	.78	
G	lb.	.21	
L	lb.	.94	
MDL	lb.	.33	
ME	lb.	.94	
NS	lb.	.60	
SMO	lb.	.50	
WAQ	lb.	.25	
Areskap 50	lb.	.30	.38
100, dry	lb.	.60	.72
Aresket 240	lb.	.30	.38
300, dry	lb.	.60	.72
Aresklene 375	lb.	.42	.57
Black No. 25, dispersed	lb.	.22	
Casein	lb.	.22	.40
Coagulant P-379	gal.	1.30	1.90
-392	gal.	1.55	2.15
CW-12	lb.	.85	
37	lb.	.70	
Dispersed Sulfur No. 2	lb.	.10	.12
Factice dispersions	lb.	.26	.42
Gelling Agent P-397	lb.	.34	.37
Habuco Resin Emulsion			
#226	lb.	.227	.232
2246-A	lb.	.275	.28
3408-B	lb.	.18	.19
Laton L	lb.	.075	.0775
Ludox	lb.	.1675	.1925
Marmix	lb.	.41	.48
Micronex, colloidal	lb.	.06	.07
Pliolite Latex 150, 190	lb.	.32	.41
170	lb.	.37	.46
Resin Emulsion A-2	lb.	.16	.25
P-370	lb.	.175	.25
X-210	lb.	.12	.22
Resin V	lb.	.13	
Santomerse D	lb.	.44	.65
S	lb.	.13	.25

CLASSIFIED ADVERTISEMENTS

ALL CLASSIFIED ADVERTISING MUST BE PAID IN ADVANCE

Effective July 1, 1947

GENERAL RATES	SITUATIONS WANTED RATES	SITUATIONS OPEN RATES
Light face type $1.25 per line (ten words)	Light face type 40c per line (ten words)	Light face type $1.00 per line (ten words)
Bold face type $1.60 per line (eight words)	Bold face type 55c per line (eight words)	Bold face type $1.40 per line (eight words)
Allow nine words for keyed address.		*Letter replies forwarded without charge, but no packages or samples.*

Address All Replies to New York Office at 386 Fourth Avenue, New York 16, N. Y.

SITUATIONS OPEN

CHEMIST—EXPERIENCED IN SPONGE RUBBER COMPOUNDing. Plant located in Fremont, Ohio. In reply please give complete résumé including age, experience, education, and salary desired. Address replies to Personnel Manager, Hewitt-Robins Inc., Buffalo, New York.

HELP WANTED MALE: LARGE RUBBER MANUFACTURER, Great Lakes Area, has excellent permanent position for young man with experience in technical rubber hose design, sales development, and product application work. Excellent employe benefits and pension. Our employes have been advised of this advertisement. Send full particulars of experience, education, age, salary range. Replies confidential. Address Box No. 1509, care of RUBBER WORLD.

RUBBER CHEMIST—MINIMUM B.S. AND 3 YEARS' EXPERIence required for research and development in compounding with an established and progressive resin manufacturer in Western Pennsylvania supplying the rubber trade. Occasional service calls. Send personal data, details of experience, and recent photograph. Address Box No. 1510, care of RUBBER WORLD.

RUBBER CHEMIST. RESEARCH DEPARTMENT OF PROGRESsive Midwestern company has opening for rubber chemist with experience in electrical applications. Applicant must have demonstrated ingenuity and ability to get things done. Position is permanent, with excellent opportunity for advancement in expanding operation. Salary commensurate with ability and experience. Please address reply with complete résumé of education and experience to Box No. 1511, care of RUBBER WORLD.

SENIOR COMPOUNDER. A PROGRESSIVE MEDIUM SIZED MIDwestern rubber company is in need of a senior compounder with thorough experience in extruded goods and solid knowledge of all phases of compounding. Good working conditions, excellent opportunity. Address Box No. 1512, care of RUBBER WORLD.

EXPORT SALES MANAGER BY LONG-ESTABLISHED MANUfacturing company. Prefer experience in rubber products and especially in South America. State experience and products handled, education, languages spoken, countries traveled, etc. Address Box No. 1513, care of RUBBER WORLD.

CABLE ENGINEER EXPERIENCED IN PRODUCTION EQUIPment and methods, design and testing of power cables. WHITNEY BLAKE COMPANY, P. O. Box K Hamden, New Haven 14, Connecticut.

SALES AND TECHNICAL SERVICE: LATEX, ADHESIVES, AND Coatings. Progressive young company. Excellent opportunity for right men. Territories open Detroit, Chicago, St. Louis, San Francisco, and Atlanta. Address Box No. 1518, care of RUBBER WORLD.

SALESMEN WANTED

To sell complete line of urea and phenolic resins, and phenolic molding compounds. All correspondence treated in confidence.

ADDRESS BOX NO. 1486,
c/o INDIA RUBBER WORLD

RUBBER CHEMIST
CALIF.—S. F. AREA

Progressive western manufacturing firm has interesting opening for qualified rubber chemist with degree and 5-10 years' practical development work in rubber compounding and production. Lab location at headquarters of company located in proximity to major universities, cosmopolitan S.F., residential suburbs and recreational facilities in a year-round mild climate. Please submit résumé and photo if available to Box No. 1501, care of India RUBBER WORLD.

WANTED TECHNICAL SALES REPRESENTATIVE

Preferably with previous latex and resin experience. This large and growing eastern latex compounder offers unusual opportunities for right applicants. Please state previous experience, education, and salary requirements. Also willingness to relocate.

ADDRESS BOX NO. 1504, C/O India RUBBER WORLD

SITUATIONS OPEN (Continued)

LATEX CHEMIST

Challenging opportunities designing custom latex formulations for specific consumer requirements, chiefly in textile coatings, paper adhesives and dipped goods fields. Medium size, well established, fast growing company in eastern Pennsylvania engaged in manufacture of latex compounds and basic rubber chemicals. B.S. degree and 2 years' minimum latex experience desired. Reply in confidence, outlining education, experience, and salary expected.

ADDRESS BOX NO. 1500
c/o India RUBBER WORLD

RUBBER CHEMISTS

Requirements: Degree in Chemistry or Chemical Engineering. Up to 5 years' experience in rubber compounding development or production.

Advantages: Well equipped laboratory, progressive company, Eastern location, contacts with customer, sales and manufacturing departments.

Write giving age, experience and education. Replies held confidential. Employees know of this ad.

ADDRESS BOX NO. 1502,
C/O India RUBBER WORLD

SALES REPRESENTATIVE

A well-established, AAA-1 manufacturer is interested in securing the services of a salesman residing in the Philadelphia-Baltimore area who is experienced in selling chemicals to the rubber, plastics and paint industries. Territory to include Southern Pennsylvania, Maryland, Virginia, and West Virginia.

Replies strictly confidential. Give record of experience and snapshot if possible.

Address: Box NO. 1503,
C/O India RUBBER WORLD

Stablex A	lb.	$0.80 /	$1.10
B, G	lb.	.50 /	.95
K	lb.	.27 /	.35
P	lb.	.35 /	.50
T	lb.	.14 /	.22
Sulfur dispersions	lb.	.12 /	.30
Webnix #34	lb.	1.50 /	2.25
Zinc oxide dispersions	lb.	.21 /	.34

Mold Lubricants

Aquarex Compounds	lb.	28 /	.97
Colite Concentrate	gal.	90 /	1.15
ELA	lb.	.82	
DC Mold Release Fluid	lb.	4.14 /	6.00
Emulsion Nos. 35, 35A, 35B	lb.	1.46 /	3.50
DC 7	lb.	6.20 /	6.80
Glycerized Liquid Lubricant, concentrated	gal.	1.48 /	1.63
Lubrex	lb.	.25 /	.30
Lubri-Flo	gal.	10.00 /	12.05
Mold Paste	lb.	.25	
Monten Wax	lb.	.57	
Para Lube	lb.	.046 /	.048
Polyglycol E series	lb.	.29 /	.42
Rubber-Glo	gal.	.94 /	.97
Soap, Hawkeye	lb.	1.35 /	1.45
Purity	lb.	.155 /	.165
Sodium stearate	lb.	.40	
Vanfre	gal.	2.50 /	3.00

Odorants

Alamasks	lb.	.75 /	6.50
Curodex 19	lb.	4.75	
188	lb.	5.75	
198	lb.	6.75	
Rodo No. 0	lb.	4.00 /	4.50
No. 10	lb.	5.00 /	5.50

Plasticizers and Softeners

Adipol 2EH, 10A	lb.	.435 /	.465
BCA	lb.	.45 /	.475
ODY	lb.	.48 /	.51
Akroflex C	lb.	.695 /	.715
Aro Lene #1980	lb.	.10 /	.12
Baker AA Oil	lb.	.195 /	.24
Crystal O Oil	lb.	.21 /	.255
Processed oils	lb.	.215 /	.235
Bardol	lb.	.0275/	.0375
639	lb.	.0275/	.045
B	lb.	.0625/	.065
Bondogen	lb.	.55 /	.60
BRC 20	lb.	.15 /	.175
30	lb.	.0125/	.021
521	lb.	.019 /	.02
BRH 2	lb.	.0213/	.0351
BRS 700	lb.	.02 /	.0285
BRT 7	lb.	.03 /	.031
BRV	lb.	.0475/	.0565
Bunarex Liquid	lb.	.0425/	.0555
Resins	lb.	.065 /	.1225
Bunnatol G. S.	lb.	.40 /	.505
Butac	lb.	.125 /	.135
BxDC	lb.	.40 /	.41
Cabflex DDA	lb.	.4475/	.4775
DDP	lb.	.34 /	.37
Di-BA	lb.	.4325/	.4625
OA	lb.	.4475/	.4775
OP	lb.	.34 /	.37
OZ	lb.	.52 /	.5475
ODA	lb.	.4475/	.4775
ODP	lb.	.34 /	.37
Cabol 100	lb.	.02 /	.07
Carbonex S	lb.	.0475/	.05
Chlorowax 40	lb.	.145 /	.225
70	lb.	.18 /	.24
-S	lb.	.21 /	.27
Contogums	lb.	.0875/	.111
Cumar EX	lb.	.0525	
MH	lb.	.065 /	.11
V	lb.	.0975/	.1275
Darex Plasticizer DBM	lb.	.30 /	.3275
Dielex B	lb.	.06	
Dinopols	lb.	.32 /	.365
Dipolymer Oil	gal.	.33 /	.38
Dispersing Oil No. 10	lb.	.06 /	.0625
Duraplex C-50 LV, 100%	lb.	.25 /	.295
Dutrex 6	lb.	.025 /	.035
Ethox	lb.	.43 /	.455
Fortex	lb.	.125 /	.145
Galex W-100	lb.	.135 /	.1725
W-100D	lb.	.1325/	.17
Gilsowax B	lb.	.09 /	.11
Good-rite GP-233	lb.	.435 /	.58
GP-261	lb.	.32 /	.47
Harchemex	lb.	.25 /	.34
Harflex 500	lb.	.315 /	.345
Heavy Resin Oil	lb.	.0225/	.0375
HSC-13	lb.	.27 /	.30
Indoil Compound 51-S	lb.	1.00 /	1.10
Indonex	gal.	.11 /	.19
Kapsol	lb.	.3225/	.3525
KP-23	lb.	.29 /	.32
-90	lb.	.45 /	.48
-140	lb.	.46 /	.485
-201	lb.	.5825/	.5925
-220	lb.	.31 /	.34
-555	lb.	.45 /	.475
Kronisol	lb.	.33 /	.355
Kronitex AA, I	lb.	.33 /	.36
Marvinol plasticizers	lb.	.28 /	.8825
Methox	lb.	.385 /	.41
Nevillac	lb.	.31 /	.85
Neville R. Resins	lb.	.13 /	.35
Nevinol	lb.	.20	
No. 1-D heavy oil	lb.	.055 /	.065
Ohopex R-9	lb.	.3525/	.3775
Q-10	lb.	.31 /	.34
Palmalene	lb.	$0.15	
Paraflex BN-1	lb.	.185 /	$0.225
Para Flux, regular	gal.	.10 /	.2125
No. 2016	gal.	.165 /	.24
2332	gal.	.11	
4205	lb.	.1075/	.2125
Para Lube	lb.	.046 /	.048
Resins	lb.	.04 /	.045
Paradene Resins	lb.	.065 /	.075
Peptizene #2	lb.	.90	
Pepton 22	lb.	.79 /	.82
Picco Resins	lb.	.13 /	.185
Aromatic Plasticizers	lb.	.048 /	.065
480 Oilproof Series	lb.	.18 /	.23
Liquid Resin D-165	lb.	.08 /	.095
S. O. S.	gal.	.29 /	.34
Piccocizers	lb.	.04 /	.07
Piccolastic Resins	lb.	.1855/	.34
Piccolyte Resins	lb.	.185 /	.25
Piccopale Resins	lb.	.12 /	.135
Piccoumaron Resins	lb.	.07 /	.185
Piccovars	lb.	.145 /	.20
Piccovol	lb.	.025 /	.038
Pictar	gal.	.25 /	.30
Pigmentar, American	lb.	.041 /	.0678
Sunny South	lb.	.0389/	.0678
Pigmentaroil, American	lb.	.041 /	.0678
Sunny South	lb.	.0389/	.0678
Pitch, Burgundy Sunny South	lb.	.098 /	.1025
Plasticizer 35	lb.	.205 /	.24
36	lb.	.305 /	.34
42	lb.	.34 /	.40
B	lb.	.35 /	.45
DP-520	lb.	.435 /	.455
MT-511	lb.	.535 /	.565
ODN	lb.	.32 /	.37
PX series	lb.	.385 /	.75
SC	lb.	.61 /	.69
Plastogen	lb.	.0775/	.08
Plastone	lb.	.22 /	.30
Polycizers	lb.	.40 /	.4775
PT67 Light Pine Oil	gal.	.60	
101 Pine Tar Oil	gal.	.335 /	.445
Pine Tars	gal.	.35 /	.46
R-19, R-21 Resins	lb.	.1075/	
Reogen	lb.	.1325/	.135
Resin C pitch	lb.	.0225/	.031
R6-3	lb.	38 /	.40
Resinex	lb.	.0325/	.0375
L-4	lb.	.0225/	.03
Rosin Oil, Sunny South	gal.	.58 /	.875
RPA No. 2	lb.	.78	
3	lb.	.47	
Conc.	lb.	.97	
5	lb.	.59	
RSN Flux	gal.	.10 /	.19
Rubber Oil B-5	lb.	.0225/	.0355
Rubberol	lb.	.2575/	.2725
Seedine	lb.	.1485/	.1705
Softener #20	gal.	.10 /	.20
Special Rubber Resin	100 lb.	.1675/	.2175
Starex Beads	lb.	.14⅞/	.15⅞
Starite	lb.	.095 /	.10
Syn-Tac	gal.	.33 /	.35
Synthol	lb.	.2475	
Thiokol TP-90B	lb.	.59 /	.69
-95, -98	lb.	.65	
TR-11	lb.	.035	
Turgum S	lb.	.1075/	.1175
Tysonite	lb.	.24 /	.2475
X-1 Resinous Oil	lb.	.021 /	.0275
XX-100 Resin	lb.	.0525	

Reclaiming Oils

Bardol	lb.	.0275/	.0375
639	lb.	.0275/	.045
B	lb.	.0625/	.065
BRH 2	lb.	.0213/	.0351
BRT 4	lb.	.025 /	.026
BRV	lb.	.0475/	.0565
Burco-RA	lb.	.055 /	.0825
BWH-1	lb.	.16 /	.18
Dipolymer Oil	gal.	.33 /	.43
Dispersing Oil No. 10	lb.	.06 /	.0625
Heavy Resin Oil	lb.	.0225/	.0375
LX-759	gal.	.16 /	.165
-774, -777	gal.	.23 /	.33
No. 1621	lb.	.025 /	.035
3186	gal.	.28 /	.295
Picco 6535	gal.	.25 /	.30
C-33	gal.	.215 /	.315
-42	gal.	.23 /	.33
D-4	gal.	.27 /	.37
E-5	gal.	.25 /	.35
Q-Oil	gal.	.286 /	.36
PT 101 Pine Tar Oil	gal.	.335 /	.445
150 Pine Solvent	gal.	.44	
Reclaiming Oil #3186	gal.	.28 /	.385
-G	gal.	.25 /	.365
4039-M	gal.	.3275/	.3975
-Y	gal.	.30 /	.37
RR-10	lb.	.36	
S. R. O.	lb.	.015 /	.0225
X-1 Resinous Oil	lb.	.021 /	.03

Reinforcers, Other Than Carbon Black

BRC 20	lb.	.15 /	.175
30	lb.	.0125/	.021
521	lb.	.019 /	.02
Bunarex resins	lb.	.065 /	.1225
Cab-o-sil (compressed)	lb.	.81	
Calcene NC	ton	72.50 /	92.50
TM	ton	75.00 /	95.00
Calco S. A.	lb.	.85 /	.88
Carbonex S	lb.	.0475/	.05
Clays			
Aiken	ton	$14.00	
Aluminum Flake	ton	20.00 /	$60.00
#5	ton	23.50 /	26.50
Buca	ton	40.00	
Burgess Iceberg	ton	50.00	
Pigment No. 20	ton	35.00	
30	ton	37.00	
Catalpo	ton	30.00	
Crown	ton	14.00 /	33.00
Dixie	ton	14.00	
L. G. B.	ton	17.00	
Paragon (R)	ton	13.50 /	33.00
Pigment No. 33	ton	30.00	
Suprex	ton	14.00 /	33.50
Witco No. 1	ton	14.00 /	30.00
No. 2	ton	13.50 /	30.00
Clearcarb	lb.	.1175/	.1225
Cumar EX	lb.	0525	
MH	lb.	.065 /	.1175
V	lb.	.0975/	.1275
Good-rite Resin 50	lb.	.42 /	.45
K Series Polymers	lb.	.15 /	.37
Hi-Sil 101	lb.	.10 /	.115
202	lb.	.11 /	.125
Kralac A-EP	lb.	.43 /	.54
Marbon resins	lb.	.42 /	.49
Multifex	ton	140.00 /	155.00
MM	ton	110.00 /	125.00
Neville R. Resins	lb.	.10 /	.155
Para Resins 2457, 2718	lb.	.04 /	.45
Pico Resins	lb.	.13 /	.185
Piccolyte Resins	lb.	.185 /	.25
Piccoumaron Resins	lb.	.07 /	.185
Piccovars	lb.	.145 /	.20
Pliolite NR types	lb.	.98 /	1.33
S-3, -6, -6B	lb.	.42 /	.49
Resin C Pitch	lb.	.0225/	.031
Resinex	lb.	.0325/	.0375
Rubber Resin LM-4	lb.	.28 /	.35
S-Polymers	lb.	.44	
Silene EF	ton	120.00 /	140.00
Silvacons	ton	55.00 /	85.00
Super Multifex	ton	160.00 /	175.00
Witcarb R	ton	105.00 /	120.00
-12	ton	45.00 /	66.00
Zeolex 20	ton	120.00 /	140.00
Zinc oxide, commercial†	lb.	.135 /	.1675

Retarders

Cumar RH	lb.	.105	
Delac J	lb.	.55 /	.60
E-S-E-N	lb.	.35 /	.37
Good-rite Vultrol	lb.	.62 /	.66
R-17 Resin	lb.	.1075/	.36
Retarder ASA	lb.	.57	
PD	lb.	.35 /	.37
TCM	lb.	.65	
W	lb.	.45	
Retardex	lb.	.47 /	.50
RM	lb.	1.25	
Thionex	lb.	1.25	

Solvents

2-50-W Hi-Flash Solvent	gal.	.41	
3-BX Naphtha	gal.	.37	
Bondogen	lb.	.55 /	.60
Cosols	gal.	.37 /	.48
Dichloro Pentanes	lb.	.04 /	.07
Dipentene DD	gal.	.445 /	.68
GVL	lb.	1.00	
LX-572 Oil	gal.	.27 /	.32
-748 Solvent	gal.	.16 /	.23
Nevsol H	gal.	.19 /	.29
HF, T	gal.	.24 /	.34
Penetrell	gal.	.445 /	.68
Picco Hi-Solv Solvents	gal.	.19 /	.45
Pine Oil DD	gal.	.755 /	.955
PT 150 Pine Solvent	gal.	.44	
Skellysolve-E	gal.	.153	
-H	gal.	.133	
-R, -V	gal.	.109	
-S	gal.	.099	

Synthetic Resins

Geon Latices (dry wt.)	lb.	.38 /	.52
Paste Resins	lb.	.38 /	.59
Plastics	lb.	.35 /	.80
Polyblend	lb.	.475 /	.575
Polyvinyl resins	lb.	.38 /	.64
Kenflex A, L	lb.	.26 /	.27
B	lb.	.23 /	.24
N	lb.	.18 /	.19
Kralastic	lb.	.65 /	1.25
Marvinol MX-300	lb.	.41 /	.57
Rigid Vinyls	lb.	.69 /	1.38
VR-10, -20, -21	lb.	.38 /	.54
Plio-Tuf G75C, G85C	lb.	.52 /	.58

Synthetic Rubber and Latices

Butaprene Latex (dry wt.)			
NL types	lb.	.47 /	.52
NXM types	lb.	.55 /	.60
Butaprene NAA	lb.	.54 /	.55
NF	lb.	.49 /	.50
NL	lb.	.50 /	.51
NXM	lb.	.58 /	.59
Chemigum 30N4NS, 50N4NS	lb.	.50 /	.52
N1NS	lb.	.64 /	.66
N3NS	lb.	.58 /	.60
N6, N7	lb.	.50 /	.52
Chemigum Latex (dry wt.)			
101 types	lb.	.35 /	.42
200, 245 types	lb.	.47 /	.55
235 types	lb.	.55 /	.63

SITUATIONS OPEN (Continued)

LATEX CHEMIST WHO HAS HAD AT LEAST THREE YEARS' experience in development of Prevulcanized Latex Compounds. Location eastern section. Excellent salary with bonus features. Other Latex experience would be helpful. Give full particulars in first letter. Replies confidential. Our staff knows of this advertisement. Address Box No. 1520, care of RUBBER WORLD.

SITUATIONS WANTED

CHEMICAL ENGINEER—11 YEARS EXPERIENCE PRODUCT DEvelopment latex-paints, fabric coatings, adhesives, vinyl-Plastisol, calendering, solution—all synthetic rubbers. Wide variety of products successfully developed. Presently chief chemist in small plant. Desires opportunity with a progressive company interested in new products. Metropolitan New York area. Address Box No. 1505, care of RUBBER WORLD.

INDUSTRIAL RELATIONS OR ADMINISTRATIVE ASST. — Young man 30, with sound experience in compounding and quality control, on footwear, flooring, molded goods, and related items, desires position where above qualifications plus heavy labor relations experience would be of value. Chem. Engr. major and business school background; presently in the East. Address Box No. 1506, care of RUBBER WORLD.

PRODUCT DEVELOPMENT CHEMIST WITH PROCESSING AND compounding-to-specification experience for molded oil seals, "O" rings, packings, bonded rubber-to-metal products, extrusions, and calendered goods with all polymers. Familiar with shop practice and problems. Address Box No. 1507, care of RUBBER WORLD.

CONSULTING CHEMIST: EXTENSIVE EXPERIENCE IN MASTIC adhesives for floor, wall, and acoustical tiles, water-base paints (latex, emulsified alkyd, exterior masonry, texture), sealers, and joint cement, desires responsible position on a permanent or consulting basis. Address Box No. 1508, care of RUBBER WORLD.

CHEMIST, B.S., WISHES TO CONTACT SMALL AND PROGRESsive manufacturer in the following lines: pressure adhesives, tapes, coated, laminated, extruded products. If the manufacturer is considering a long-range program of development work and business growth and would treat as important the character as well as the technical efficiency of the applicant chief chemist, then he offers his considerable experience to head up such development program at a salary reasonable to both parties. Address Box No. 1517, care of RUBBER WORLD.

MANAGER—DEVELOPMENT OR SALES—18 YEARS' BROAD experience in development, design, manufacture, and sale of soft and hard rubber mechanical and plastic products. Young, progressive engineer seeks administrative position with small or medium company. Eastern location preferred. Others considered. Address Box No. 1519, care of RUBBER WORLD.

MACHINERY AND SUPPLIES FOR SALE

FOR SALE: FARREL 16" X 48" and 15" X 36", 2-ROLL RUBBER mills, and other sizes up to 84". Also new and used lab. 6" x 12" x 6" x 16" mixing mills and calenders. Six American Tool 300-gallon Churns. Extruders 1" to 6". Baker-Perkins Jacketed Mixers 100, 50, and 9 gals., heavy-duty double-arm. 350 ton upstroke Hydr. Press 22" x 24" platens. 325 ton upstroke 42" x 24" platens. Brunswick 200-ton 21" x 21" platens. Large stock of hydraulic presses from 12" x 12" to 48" x 48" platens from 50 to 2,000 tons. Hydraulic Pumps and Accumulators. Rotary Cutters. Stokes Automatic Molding Presses. Single Punch & Rotary Preform Machines, Banbury Mixers, Crushers, Churns, Rubber Bale Cutters, etc. SEND FOR SPECIAL BULLETIN. WE BUY YOUR SURPLUS MACHINERY. STEIN EQUIPMENT CO., 107—8th St., Brooklyn 15, N. Y. STerling 8-1944.

Hycar 1001, 1041	lb.	$0.53 /	$0.59
1002, 1042, 1043	lb.	.50 /	.51
1014, 1312	lb.	.60 /	.61
1411	lb.	.62 /	.63
1432	lb.	.59 /	.60
1441	lb.	.64 /	.65
Hycar Latex (dry wt.)			
1512, 1552, 1562, 1577	lb.	.46 /	.52
1551, 1561	lb.	.54 /	.60
1571	lb.	.59 /	.65
1572	lb.	.51 /	.57
Neoprene Latex (dry wt.)			
Type 571, 842-A	lb.	.37 /	.48
572	lb.	.39 /	.50
601-A, 735	lb.	.40 /	.51
735	lb.	.38 /	.49
Neoprene Type AC, CG	lb.	.55 /	.80
GN, GN-A, W, WHV	lb.	.41 /	.44
GRT, S	lb.	.42 /	.45
KNR	lb.	.75 /	.78
Q	lb.	1.00 /	1.03
WRT	lb.	.45 /	.48
Paracril 18-80	lb.	.60 /	.61
AJ	lb.	.485 /	.495
Paracril			
B, BJ	lb.	.50 /	.51
BV	lb.	.51 /	.52
C	lb.	.58 /	.59
CS, CV	lb.	.59 /	.60
Paraplex X-100	lb.	1.00	
Silastic	lb.	2.30 /	4.05
Thiokol LP-2, -3	lb.	.96	
-8	lb.	1.25	
PR-1	lb.	1.95	
Type A	lb.	.47	
FA	lb.	.64	
ST	lb.	1.00	
Thiokol Latex (dry wt.)			
Type MF	lb.	.85	
MX	lb.	.70	
WD-2	lb.	.92	
-6	lb.	.70	

Tackifiers

Bunarex resins	lb.	.065 /	.1225
Chlorowax 70	lb.	.18 /	.24
Contogums	lb.	.0875/	.11
Galex W-100	lb.	.155 /	.1925
W-100D	lb.	.1525/	.19
Indopol H-100	gal.	.85 /	1.00
H-300	gal.	1.00 /	1.16
Natac	lb.	.12 /	.13
Nevindene	lb.	.15 /	.18
Picco Resins	lb.	.13 /	.185
Piccolastic Resins	lb.	.1855/	.34
Piccolyte Resins	lb.	.185 /	.25
Piccopale Resins	lb.	.12 /	.135
Piccoumaron Resins	lb.	.07 /	.185
Synthetic 100	lb.	.41	
Synthol	lb.	.2475/	.2625

Vulcanizing Agents

Dibenzo G-M-F	lb	2.60	
G-M-F #113	lb.	.90	
G-M-F	lb.	2.60	
#117	lb.	.90	
Ko-Blend I, S	lb.	.385	
Litharge, commercial	lb.	.16 /	.165
Eagle, sublimed	lb.	.16 /	.161
Magnesium oxide	lb.	.23 /	.25
Red lead, commercial	lb.	.1625/	.1775
Eagle	lb.	.17	
Sulfasan R	lb.	1.50	
Sulfur flour, comml	100 lbs.	2.30 /	3.05
Calco	100 lbs.	2.15 /	7.50
Crystex	lb.	.195	
Insoluble 60	lb.	.125 /	.13
Rubbermakers	100 lbs.	2.40 /	4.30
Stauffer	lb.	.0215/	.0335
Telloy	lb.	2.50	
Vandex	lb.	4.75	
Vultac No. 2	lb.	.47 /	.755
3	lb.	.51 /	.795
White lead silicate	lb.	.155 /	.1875
Eagle	lb.	.175 /	.1925

United States Rubber Statistics — February, 1954

(All Figures in Long Tons, Dry Weight)

	New Supply			Distribution		
	Production	Imports	Total	Consumption	Exports	Month-End Stocks
Natural rubber and latex, total	0	42,645	42,645	46,897	638	114,326
Rubber, total	0	36,964	36,964	41,302	638	102,265
Latex, total	0	5,681	5,681	5,595	0	12,061
Synthetic rubbers, total	*45,428 †7,928	946	54,272	49,060	2,048	183,405
GR-S types‡	*40,661 †148	882	41,691	37,707	508	143,202
Butyl	*4,767	34	4,801	5,696	2	23,573
Neoprene‡	†6,206	0	6,206	4,467	1,251	12,518
Nitrile type‡	†1,574	0	1,574	1,190	287	4,112
Natural rubber and latex, and synthetic rubbers, total	53,356	43,561	96,917	95,957	2,686	297,731
Reclaimed rubber, total	21,000	122	21,122	19,461	941	32,393
GRAND TOTALS	74,356	43,683	118,039	115,418	3,627	330,124

*Government plant production.
†Private plant production.
‡Includes latices.
SOURCE: Chemical & Rubber Division, BDSA, United States Department of Commerce, Washington, D. C

Estimated Pneumatic Casings, Tubes, Camelback Shipments, Production, Inventory, March, February, 1954; March, 1953; First Quarter, 1954-1953

	Original Equipment	Replacement	Export	Total	Production	Inventory
Passenger Casings						
March, 1954	2,808,892	3,753,088	45,091	6,607,071	6,877,879	13,111,582
Change from previous month				+22.72%	+15.55%	+2.18%
February, 1954	2,322,984	3,001,131	59,761	5,383,876	5,952,480	12,831,883
March, 1953	3,039,179	3,793,323	41,494	6,873,996	7,918,828	13,364,132
1st 3 months, 1954	7,680,775	10,132,552	163,533	17,976,860	18,081,762	13,111,582
1953	8,366,488	10,869,853	102,846	19,339,187	21,590,323	13,364,132
Truck and Bus Casings						
March, 1954	354,448	596,506	71,316	1,022,270	1,102,846	2,965,526
Change from previous month				+10.65%	+1.24%	+3.08%
February, 1954	310,769	556,161	56,912	923,842	1,089,301	2,876,813
March, 1953	530 874	804,824	45,832	1,381,530	1,487,707	3,091,734
1st 3 months, 1954	1,007,166	1,767,631	187,064	2,961,861	3,240,229	2,965,526
1953	1,470,231	2,417,433	153,531	4,041,195	4,290,652	3,091,734
Total Automotive Casings						
March, 1954	3,163,340	4,349,594	116,407	7,629,341	7,980,725	16,077,108
Change from previous month				+20.95%	+13.33%	+2.35%
February, 1954	2,633,753	3,557,292	116,673	6,307,718	7,041,781	15,708,696
March, 1953	3,570,053	4,598,147	87,326	8,255,526	9,406,535	16,455,866
1st 3 months, 1954	8,687,941	11,900,183	350,597	20,938,721	21,321,991	16,077,108
1953	9,836,719	13,287,286	256,377	23,380,382	25,880,975	16,455,866
Tractor-Implement Casings						
March, 1954	208,092	152,889	5,331	366,312	305,887	665,275
Change from previous month				+29.61%	+25.94%	−7.98%
February, 1954	156,102	120,981	5,550	282,633	242,889	722,947
March, 1953	307,487	142,396	5,551	455,434	448,097	841,929
1st 3 months, 1954	521,111	382,078	15,363	918,552	752,502	665,275
1953	878,417	406,192	13,780	1,298,389	1,266,173	841,929
Passenger, Motorcycle, Truck and Bus Inner Tubes						
March, 1954	3,164,947	2,773,707	74,356	6,013,010	6,398,644	10,869,324
Change from previous month				+7.05%	+8.52%	+4.03%
February, 1954	2,635,520	2,908,033	73,701	5,617,254	5,896,024	10,448,121
March, 1953	3,570,595	2,971,180	44,422	6,586,197	7,551,241	11,383,584
1st 3 months, 1954	8,684,413	9,574,178	205,670	18,464,261	17,689,823	10,869,324
1953	9,844,145	10,578,604	144,087	20,566,836	20,243,614	11,383,584
Camelback (Lbs.)						
March, 1954	—	19,968,914	1,560,240	21,529,154	20,948,890	27,342,714
Change from previous month				+12.07%	+4.25%	+0.27%
February, 1954	—	18,645,912	564,163	19,210,075	20,095,430	27,268,002
March, 1953	—	19,342,400	613,760	19,956,160	23,040,640	31,037,440
1st 3 months, 1954	—	59,112,686	2,774,342	61,887,028	62,920,968	27,342,714
1953	—	63,329,280	2,291,520	65,620,800	73,270,400	31,037,440

NOTE: Cumulative data on this report include adjustments made in prior months.
SOURCE: The Rubber Manufacturers Association, Inc., New York 22, N. Y.

Beta-Ray Gage

(Continued from page 408)

uring devices manufactured by Industrial Nucleonics Corp., Columbus, O. Designated as Model RBM, the new instrument is, like its predecessors, mounted over (or under) a moving process line. The mounting mechanism of RBM is the major advantage of the model, however, because unlike the previous units, it does not require any clearance at its lengthwise extremities for retracting.

As a non-contacting reflection gage, the new unit is constructed with both the radiation source and radiation detector located in a common housing, and the recording console at a remote point. Operation is based on the principle that the amount of electrons reflected back from the coated material is proportional to the type and the thickness of the coating. Thus, with a given base material (or metal roll), the number of reflected electrons varies with the coating depth, and measurement of this number is translatable to thickness or weight per unit area. Weight range for the instrument is dependent on the material being measured, the sensitivity required, and the type of base material.

Widths up to 160 inches can be easily handled by the device, according to the company. The head containing the source and detector traverses the sheet width on tubular supports, being positioned along the transverse by an electrical servo mechanism. The gage functions from a 100-130 volt, five-ampere d.c. source, and is subject to an automatic standardization cycle which periodically compensates for changing ambient conditions, circuit variations, and source decay.

MACHINERY AND SUPPLIES FOR SALE (Continued)

W & P 100-GAL. DOUBLE-ARM JACKETED MIXER, SIGMA blades; B-P #14 JEM 50-gal., 50 HP. double-arm jacketed vacuum Mixer, sigma blades. Kux model 25 Rotary Pellet Presses, 21 and 25 punch. Large stock steel and stainless steel kettles and tanks. PERRY EQUIPMENT CORP., 1424 N. 6th St., Phila. 22, Pa.

FOR SALE: 1—HORIZONTAL VULCANIZER, 6' DIA. X 10' LONG, with track & carriage. Simplex quick-opening door. Address Box No. 1515, care of RUBBER WORLD.

FOR SALE: COMPLETE #9 BANBURY BODY FULLY REBUILT; 1 pair #27 Banbury steel rotors, rebuilt; #27 Banbury side jackets, rebuilt; #27 Banbury bull gear, pinion and pinion shaft. INTERSTATE WELDING SERVICE, Offices, Metropolitan Bldg., Akron 8, Ohio.

FOR SALE: 1—48" X 36" HYDRAULIC PRESS, 24" RAM; 1 ROYLE #2 Tuber; 1—10" x 20" 2-roll rubber mill, M.D. 1—5' x 28' vulcanizer, q.o. door. Also Banbury mixers, calenders, cutters, etc. CHEMICAL & PROCESS MACHINERY CORP., 148 Grand Street, New York 13, N. Y.

GOOD USED MACHINERY

WANTED
YOUR IDLE EQUIPMENT

1—F. B. 32" x 92" inverted-L 4-roll Calender, reduction drive, D.C. varispeed motor.
1—French Hydraulic Press, 42" x 42", 7 heated platens, 20" dia. ram.
1—Southwark Hydraulic Press, 48" x 48", 7 heated platens, 4—12" dia. rams.
1—Adamson 5' x 28' Vulcanizer, quick-opening door, A.S.M.E.; 1—5' x 12' quick-opening door, 125 psi.
1—Royle #4 Extruder, motor driven.
1—S. B. 8" x 16" 3-roll Calender, 20 H.P. motor.
1—6" x 12" Laboratory Mill, m.d.
1—Ball & Jewell #2 Rotary Cutter, 15 H.P. motor.
3—#28 Devine Vac. Shelf Dryers, 19-59" x 78" shelves, complete.
Also other sizes Hydraulic Presses, Tubers, Banbury Mixers, Mills, Vulcanizers, Calenders, Pellet Presses, Cutters.

PHONE—WIRE—WRITE • *Send us your inquiries*

Consolidated Products Company, Inc.
64 Bloomfield St., Hoboken, N. J.
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"Our 37th Year" Cable Address: Equipment Hoboken, N.J.

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WANTED: RUBBER MACHINERY, INCLUDING BANBURY MIXERS, Heavy-Duty Mixers, Calenders, Rubber Rolls & Mixers, Extruders, Grinders & Cutters, Hydraulic Equipment, Rotary and Vacuum Shelf Driers, Injection Molding Machines. Will consider a now-operating or shut-down plant. P. O. Box 1351, Church Street Sta., New York 8, N. Y.

WANTED TO BUY: #11 BANBURY WITH OR WITHOUT MOTOR. Must be in good condition. No dealers, please. Address Box No. 1516, care of RUBBER WORLD.

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All mixing done under careful supervision and laboratory control.

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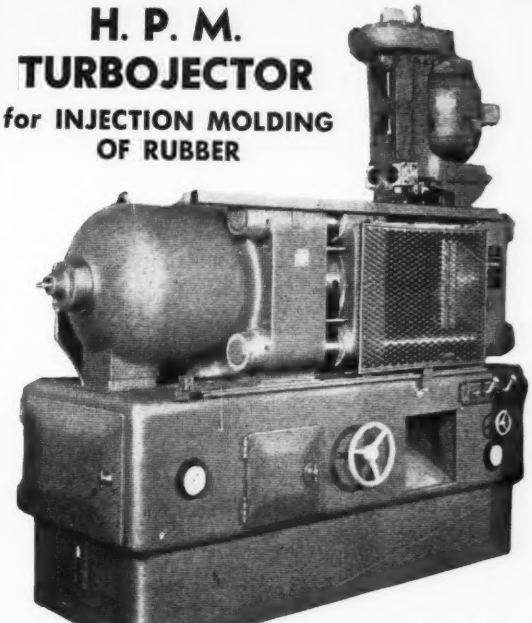
Pequanoc Rubber Co.
MANUFACTURERS OF RECLAIMED RUBBER
MAIN SALES OFFICE and FACTORY, BUTLER, N. J.

H. P. M. TURBOJECTOR

for INJECTION MOLDING OF RUBBER



Manufactured in 1947

SPECIFICATIONS

450 Ton Mold Clamp Capacity. Mold space Horizontal and Vertical 21½" x 28". Clearance between Tie Rods 21½" x 16¼". Daylight 28½" Speeds 82 to 144. Motor Clamp HP 10. Motor Screw HP 15.

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To Your Specification
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881 State Street Tel: State 7-5662
Otto J. Lang, General Manager

U. S. Imports, Exports, and Reexports of Crude and Manufactured Rubber

Imports for Consumption of Crude and Manufactured Rubber

	January, 1954	
	Quantity	Value
UNMANUFACTURED, LBS.		
Crude rubber	93,506,935	$15,981,655
Latex	12,086,909	2,696,694
Balata	135,998	30,769
Jelutong or Pontianak	165,706	60,746
Gutta percha	20,187	23,425
Crude chicle	1,227,296	778,815
Synthetic rubber	1,680,911	477,319
Reclaimed rubber	148,672	8,956
Scrap rubber	2,488,029	95,011
TOTALS	111,460,643	$20,153,390
MANUFACTURED		
Rubber tires		
Auto, etc ... *no.*	6,678	$179,574
Bicycle ... *no.*	1,470	1,813
Other ... *no.*	3	318
Inner tubes		
Auto, etc ... *no.*	255	577
Footwear		
Boots ... *prs.*	9,437	38,632
Shoes and overshoes ... *prs.*	24,310	13,056
Rubber-soled canvas shoes ... *prs.*	5,100	3,007
Athletic balls		
Golf ... *no.*	78,960	21,123
Tennis ... *no.*	23,088	3,547
Other ... *no.*	98,640	11,323
Toys	......	19,612
Hard rubber goods		
Combs ... *no.*	28,372	3,463
Other	......	30,311
Rubber and cotton packing ... *lbs.*	5,660	10,340
Gasket and valve packing	......	9,086
Belting ... *lbs.*	9,432	8,393
Hose and tubing	......	6,963
Gloves ... *prs.*	44,292	11,863
Nipples and pacifiers ... *gr.*	850	1,358
Instruments ... *doz.*	4,307	12,299
Soles and heels ... *lbs.*	13,666	13,096
Other	......	1,389
Synthetic rubber products	......	2,530
Other soft rubber goods	......	128,139
TOTALS	......	$531,812
GRAND TOTALS, ALL RUBBER IMPORTS	......	$20,685,202

Exports of Domestic Merchandise

	January, 1954	
	Quantity	Value
UNMANUFACTURED, LBS.		
Chicle and chewing gum bases	329,528	$143,503
Balata, gutta percha, etc.	4,500	2,695
Synthetic rubbers		
GR-S types	1,383,270	416,412
Butyl	100	1,293
Neoprene	973,185	423,452
Nitrile type	660,365	347,371
Other	113,055	76,219
Reclaimed rubber	2,043,598	173,536
Scrap rubber	1,030,307	34,211
TOTALS	6,537,908	$1,618,692
MANUFACTURED		
Rubber cement ... *gals.*	75,894	$128,241
And rubberized fabric ... *sq. yds.*	187,900	171,041
Clothing	......	64,089
Footwear		
Boots and shoes ... *prs.*	7,358	33,524
Rubber-soled canvas shoes ... *prs.*	18,962	35,071
Heels ... *doz. prs.*	60,256	67,450
Soles, soling, toplift sheets ... *lbs.*	647,296	158,996
Gloves and mittens ... *doz. prs.*	22,904	97,584
Drug sundries	......	169,397
Toys, balls, novelties	......	40,233
Hard rubber goods		
Battery boxes ... *no.*	28,938	52,838
Other electrical goods ... *lbs.*	251,247	165,627
Other	......	24,929
Rubber tires and casings		
Truck and bus ... *no.*	51,304	2,381,912
Auto and motorcycle ... *no.*	54,549	676,688
Aircraft ... *no.*	3,300	171,135
Off-the-road ... *no.*	11,183	993,795
Farm tractor ... *no.*	4,454	158,978
Implement ... *no.*	1,941	35,266
Other ... *no.*	8,548	39,944
Inner tubes		
Auto ... *no.*	17,690	34,951
Truck and bus ... *no.*	31,825	118,181
Aircraft ... *no.*	992	12,874
Other ... *no.*	11,571	44,108
Solid tires		
Truck and commercial ... *lbs.*	919	25,485
Tire repair material		
Camelback ... *lbs.*	772,241	210,699
Other ... *lbs.*	251,656	210,027

	January, 1954	
Rubber	Quantity	Value
Tape, except medical and friction ... *lbs.*	44,147	34,249
Belting		
V-type, vehicle fan ... *lbs.*	77,072	115,749
Transmission		
V-type ... *lbs.*	74,002	150,564
Flat belts ... *lbs.*	34,973	48,122
Conveyor and elevator ... *lbs.*	47,995	54,378
Other ... *lbs.*	1,660	4,822
Hose		
Molded and braided ... *lbs.*	249,966	226,243
Wrapped and hand built ... *lbs.*	159,317	142,693
Other hose and tubing ... *lbs.*	51,184	67,128
Packing		
Sheet type ... *lbs.*	56,440	38,237
Other ... *lbs.*	175,636	288,204
Tiling and flooring ... *lbs.*	195,134	60,841
Mats and matting ... *lbs.*	317,631	110,137
Thread		
Bare ... *lbs.*	13,427	22,254
Textile covered ... *lbs.*	14,008	41,128
Compounded rubber for further manufacture ... *lbs.*	770,313	291,642
Other rubber manufactures	......	589,599
TOTALS	......	$8,609,026
GRAND TOTALS, ALL RUBBER EXPORTS	......	$10,227,718

Reexports of Foreign Merchandise

	Quantity	Value
UNMANUFACTURED, LBS.		
Crude rubber	1,452,163	$360,542
Balata, gutta percha, etc.	6,913	2,835
Chicle and chewing gum bases	2,923	2,327
TOTALS	1,461,999	$365,704
MANUFACTURED		
Rubber soles, soling, toplift sheets ... *lbs.*	11,200	$4,528
GRAND TOTALS, ALL RUBBER REEXPORTS	1,473,199	$370,232

SOURCE: Bureau of the Census, United States Department of Commerce, Washington 25, D. C.

Butyl Rubber

(Continued from page 369)

Summary and Conclusions

In summary, this article and the preceding one by R. M. Thomas[5] will be considered together.

Butyl is a general-purpose rubber. The inherent properties of this polymer contribute to the quality of many products. Six grades of Butyl, representing four different cure rates and three different plasticities, are currently available. Butyl mixes very easily in a Banbury mixer, and processing techniques improve as experience is gained in factory operations.

The consumption of Butyl is increasing. Practically all inner tubes in the United States and Canada are made with this polymer. The acceptance of Butyl for applications other than inner tubes has grown steadily since 1947 and is continuing at a rapid pace today.

The thermal interaction of Butyl with carbon black offers many improvements in the properties of the vulcanizates. The tensile strength and modulus are increased, accompanied by improvements in both resilience, as measured by reduced damping, and in hysteresis characteristics.

Both laboratory studies and actual tire tests show improvement in abrasion resistance when heat treated carbon black stocks are used. Better dispersion of the black undoubtedly accounts for the improved resistance of this type of Butyl stock to acid and for improved electrical properties. Samples of the heat interacted compound are more snappy and resilient when compared with those from a normal mix. This improved flexibility is also apparent at low temperatures.

In addition to the improved physical properities, the processing of the heat treated compounds are superior in both extruder and calender operations as compared to the processing of the conventionally mixed compounds.

The sum and total of the improvements gained by the thermal interaction of Butyl with carbon black should be of significance in making present products better and in contributing to the development of new products for the future.

Protective Plastic Skin for Aircraft

A wash primer formulation of polyvinyl butyral, product of Monsanto Chemical Co., is being used to coat aircraft with a plastic skin 0.0003-0.0005-inch thick. Purpose of the coating is to protect the outer surface of the aircraft from the corroding effects of foul weather, salt spray, and high humidity. The film of plastic, the same material which is used in shatterproof windows, also facilitates painting of the surfaces with insignia and other markings, according to the company.

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... two men on a horse

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